EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-11

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013	Particle Emissions Measurement
	Base Option Period Number 1	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 6 Aircraft, Task 10 Training, Task 11 Peer

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/02/2012 To 01/14/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Bob Giannelli (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4708 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Angela Lower (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2036 FAX Number:

PERFORMANCE WORK STATEMENT

A. EPA Contract:	EP-C-12-011
B. Work Assignment (WA):	1-11
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Particle Emissions Measurement Training and Analysis, Continuation
F. Work Assignment Manager (WAM)	Dr. Bob Giannelli 734-214-4708 giannelli.bob@epa.gov
Alternate WAM	Bryan Manning 734-214-4832 manning.bryan@epa.gov

I. BACKGROUND

Measurement of particulate matter (PM) emissions from combustion engines is motivated by the detrimental health effects PM has on human health. PM from combustion sources is chemically complex and has transport properties different than gaseous emissions and hence needs careful consideration; the metric by which it is measured and the method of measurement is under extensive discussion. Additionally, improvements in engine operation and exhaust after treatment devices have been decreasing PM emissions to levels that are pushing the lower limits of current mass measurement devices.

In order to address measurement limits, a well-intentioned program in Europe has been initiated using nonvolatile particulate matter number as the regulatory metric. The California Air Resources Board (CARB), California's air quality regulatory agency, is also considering a number metric for regulatory purposes. However, this number metric is not expected to replace the total PM mass-based National Ambient Air Quality Standard (NAAQS) because, if it is used alone, it will not fully address the short comings of a PM mass measurement. However, the U.S. EPA believes there is a necessity at this point to address the PM number metric with a reference method that attempts to address the motivations behind regulatory actions, i.e., detrimental health effects.

PM is distinguished from gases by its relative size to gases and its resultant transport and chemical processes. When designing a sampling system, a main concern of measuring PM is the inherent losses that can take place in the sample train during transport from the emissions source to the measurement instrument. These losses can lead to an underestimation of the amount of true PM emissions from a combustion source. In measuring PM from an aircraft engine, the sample train has been determined to have sample line lengths and thermal differences between the sample gas and the sample train elements that are unavoidable. Estimates of the nonvolatile particulate matter mass loss in the sample train are on the order of 40-50%. This large loss leads to a reasonable concern over the accuracy of the measurement method.

In order to address the two items above, (i.e., design a measurement reference method for particle number and review of a method to estimate sampling train particle losses), the EPA has determined that it has the following needs:

1) A need for training to fully understand the nature of PM emissions, measurement, characterization, and source development. Specialized training in the physical and chemical properties of aerosol particles and their interaction with the atmosphere is also required. As a result of this training, EPA will be better positioned to develop a PM number measurement reference method.

2) A need for a PM emission measurement expert who can review a PM emissions measurement sample train and the methods for estimating losses in PM sample trains and deliver a report on the findings of the review.

This work assignment (WA) continues and expands upon the work started under WA 0-11 and WA 0-11, Amendment 1 of contract EP-C-12-011.

II. TASKS

The purposes of this work assignment are to obtain training required to allow EPA to develop a particulate matter number measurement reference method and to have a PM number expert perform a review of a PM measurement method. Any aspect of the tasks below that were not completed under WA 0-11, or under WA 0-11, Amendment 1, shall be completed under this work assignment.

Task 1

The Contractor shall arrange for training to be provided by technical experts in the subject areas described in subtasks below. Training shall be provided to EPA at its Ann Arbor office prior to December 14, 2012. The address where the training shall be provided is:

2000 Traverwood Dr.
Ann Arbor, Michigan 48105

For Subtask 1A, 3-5 trainers shall be provided and for Subtask 1B, 4-7 trainers shall be provided; however, the total number of trainers under this task shall not exceed 10. Each trainer shall provide 2-8 hours of training, as applicable depending on the trainer's proposed agenda. Only one trainer shall be scheduled for any given day. EPA will provide a list of subject area technical experts who the Contractor may wish to consider for the purposes of this WA. The Contractor shall discuss with the EPA WAM the proposed list of trainers and associated training dates prior to engaging said trainers. The EPA WAM will provide final approval of the trainer and associated training dates via written technical direction.

Subtask 1A: PM Emissions, measurement, characterization, source development

EPA requires the knowledge of experts in sampling and characterization of aerosol particles ranging from particles as small as 1 nm diameter up to particles exceeding 100 μm in size. At minimum, an expert shall be able to address the following topics:

a. characterization of devices for removing particulate matter from combustion products;
b. dynamics of diesel exhaust and other carbonaceous aerosols;
c. electronic engine control, engine sensors, and on-board diagnostics;
d. continuous measurement of airborne particulate sulfur, carbon, and nitrogen;
e. measurement of ultrafine particles in gases and liquids including analysis of PM loss in the PM measurement sample trains;
f. the physical and chemical characterization of exhaust emissions;
g. the evaluation of emission controls;
h. the evaluation and demonstration of alternative fuels, certification of on- and off-highway engines, and the evaluation of control technology in the field;
i. engine test cells for engines from 10 to 600 hp, and computer-controlled dynamometers capable of simulating many transient and steady-state duty cycles;
j. assisting industry and government in developing and evaluating technologies to meet present and future emission standards;
k. dilution system design and development of PM emissions sources such as EPA's PM generator.

Suggested experts for Subtask 1A:
1) Rick Flagan (California Institute of Technology, phone: 626-395-4383, email: flagan@cheme.caltech.edu)
2) Imad Khalek (SwRI, phone: 210-522-2536, email: imad.khalek@swri.org)
3) David Kittleson (University of Minnesota, phone: 612-625-1808, email: kitte001@umn.edu)
4) Mike Kleeman (University of California, Davis, phone: 530-752-8386, email: mjkleeman@ucdavis.edu)
5) Peter McMurray (University of Minnesota, phone: 612-624-2817, email: mcmurry@me.umn.edu)
6) David Pui, (University of Minnesota, phone: 612 625-2537, email: dyhpui@umn.edu)

Subtask 1B: Subject Area: Properties of aerosol particles, including atmospheric interaction

EPA requires the knowledge of established experts on laboratory characterization and modeling of atmospheric chemistry and formation of secondary organic aerosols and the gaseous precursors responsible for their formation. At minimum, an expert shall be able to address the following topics:

a. laboratory studies of the growth, crystallization, nucleation, and freezing of aerosol particles under atmospherically relevant conditions;
b. modeling of atmospheric chemistry and formation of secondary organic aerosols and the gaseous precursors responsible for their formation;
c. laboratory phase transitions studies of aerosol particles methods such as optical microscopy;
d. laboratory studies of chemical composition and morphological features through the use of methods such as computer-controlled scanning electron microscopy with energy dispersive analysis of X-rays (CCSEM/EDX) and scanning transmission X-ray microscopy with near edge X-ray absorption fine structure spectroscopy (STXM/NEXAFS);
e. laboratory studies of chemical composition and morphological using electron and X-ray beams for imaging, spectroscopy and diffraction and ultrafast X-ray holography;
f. multiscale computational nanoscience to study the formation and fate of nanoparticles in the environment

Suggested experts for Subtask 1B:

1) Daniel Knopf (State University of New York, Stoney Brook, phone: 631-632-3092, email: Daniel.Knopf@stonybrook.edu)
2) Robert McGraw (Brookhaven National Laboratory, email: rlm@bnl.gov, website : http://www.ecd.bnl.gov/asdrosters.html#mcgraw)
3) Joyce Penner (Ralph J. Cicerone Distinguished University Professor of Atmospheric Science, University of Michigan, phone: (734) 936-0519, email: penner@umich.edu)
4) Allen Robinson (Carnegie-Mellon University, Pittsburgh, PA, phone: 412-268-3657, email: alr@andrew.cmu.edu)
5) John Spence (Arizona State University, phone: 480-965-6486, email: john.spence@asu.edu)
6) John Venables (Arizona State University, phone: 480-965-1675, email: venables@asu.edu)
7) Angela Violi (Associate Professor of Mechanical Engineering, Biomedical Engineering, and Chemical Engineering, phone: (734) 615-6448, email: avioli@umich.edu)
8) Alla Zelenyuk-Imre, (Pacific Northwest National Laboratory, Richland, WA, phone: 509-371-6155, website: http://www.pnl.gov/science/staff/staff_info.asp?staff_num=5531)

Task 2 – Evaluation of of the methodologies for measuring the properties and characterization of aerosol transport systems and losses

The EPA requires the knowledge of established experts on physical and numerical modeling of aircraft engine emissions characterization and contrail formation, including analysis of PM loss

in the PM measurement sample trains. The contractor shall provide 2-3 experts to review the methods being developed by the SAE E-31 Aircraft Exhaust Emissions Measurement Committee to account or correct for PM loss in the sample trains (for PM aircraft engine test procedure being developed by E-31). The experts shall review the E-31 methods, including any papers, reports, and documentation generated by E-31 for this PM loss correction method, and each provide a technical report or memorandum on their assessment of this method.

The contractor may consider experts found in the suggested expert lists from Subtasks 1A and 1B to complete this task.

Each expert shall have at least one but no more than two trips for two full days of meetings to the EPA Office Building in Ann Arbor, MI for in-person discussion. One of those trips shall be near the end of the review to discuss the reviewers' findings. The other should be at the beginning of the review. Logistics and timing shall be discussed with the EPA WAM prior to scheduling the trips.

Additionally, each expert shall have at least one trip for two full days of meetings to the United Technologies Research Center in East Hartford, Connecticut and one trip for two full days of meetings to the Missouri University of Science and Technology in Rolla, MO for consultation with the authors of the PM loss estimation method to answer any questions about the PM loss estimation method. Logistics and timing shall be discussed with the EPA WAM prior to scheduling the trips.

In accordance with Section H.22 of the subject contract, EP-C-12-011, the contractor shall seek and receive separate approval from the EPA Project Officer prior to any contractor travel taking place under this work assignment. This approval shall be separate from the process associated with the approval of a work plan.

III. DELIVERABLES

1. Kick off Meeting. Within one week after the WA is issued, but prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WAM to ensure a common understanding of the requirements, expectations, and ultimate end products.

2. Schedule Training. Within one week of receipt of written technical direction from the EPA WAM, the Contractor shall schedule each training session. Each trainer shall provide a training session agenda to the EPA WAM one week prior to arrival. Trainers shall provide an electronic copy of presentation materials with the EPA WAM.

3. Weekly Progress Reports. The contractor shall provide the EPA WAM with brief weekly status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

Schedule of Deliverables

Steps	Completion Date
Complete Tasks 1 and 2	Before December 14, 2012

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by the U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-11

☐ Other ☒ Amendment Number: 000001

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2016 Base Option Period Number 1	Particle Number Training

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Tasks 6, 10, 11

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 10/02/2012 To 09/30/2013

Comments:
This work assignment amendment 1 extends the period of performance to 09/30/13. No additional costs are expected as a result of this extension. No further action by the Contractor is required.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
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Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2016 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Bob Giannelli (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4708 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

A. EPA Contract:	EP-C-12-011
B. Work Assignment (WA):	1-11, Amendment 1
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Particle Emissions Measurement Training and Analysis, Continuation
F. Work Assignment Manager (WAM)	Dr. Bob Giannelli 734-214-4708 giannelli.bob@epa.gov
Alternate WAM	Bryan Manning 734-214-4832 manning.bryan@epa.gov

ACTION:

This amendment extends the period of performance of this work assignment, WA 1-11, through 9/30/2013.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-12

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Refinery Modeling Training

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 1 Fuels Analysis, Task 10 Training

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/04/2012 To 09/30/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

SFO (*Max 2*): ☐

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
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Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2013		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Lester Wyborny (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4473 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Angela Lower (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2036 FAX Number:

PERFORMANCE WORK STATEMENT

A.	EPA Contract:	EP-C-12-011
B.	Work Assignment (WA):	1-12
C.	Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D.	Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E.	Statement of Work:	Refinery Modeling Training
F.	Work Assignment Manager (WAM):	Lester Wyborny, wyborny.lester@epa.gov, (734) 214-4493
	Alternate WAM:	Russ Smith, smith.russ@epa.gov, (202) 343-9996

I. Background

To conduct cost analyses, EPA staff use Haverly's GRTMPS (Generalized, Refining Transportation Marketing Planning System) linear programming refinery model. Currently, EPA staff is running the GRTMPS refinery model on an aggregated 5 region refinery cost model case, as well as individual PADD models. The 5 region case was developed solely by Jacobs Consultancy.

Because the GRTMPS models are complex refinery models, EPA staff requires additional training support to operate the models correctly. This training support includes review and analysis of modeling outputs generated by EPA to ensure realistic results.

II. Task

This work assignment (WA) continues and expands upon the work started under WA 0-12.

The contractor shall provide training to EPA regarding any or all aspects of the GRTMPS (Haverly) model and its components on the 5-region model and the individual PADD models. The contractor shall also provide training in developing, running and interpreting a separate spreadsheet program for conducting a mass and energy balance.

This training shall include set-up assistance and troubleshooting, incorporating model components in running the model, changing input values and output forms, and guiding EPA in evaluating results obtained by EPA's modeling effort for completeness, accuracy, and viability. The training could also include suggested changes to model tolerances to ensure convergence.

The EPA WAM will specify the refinery modeling issues to be covered and the order in which they are covered via written technical direction; however, the Contractor may also suggest topics. Training shall be provided in person at the Contractor's site, via teleconference, or via videoconference. The Contractor shall provide for a total training time of one business week (5 days). These could be full days, part-days, or even as short as hour-long sessions. Any electronic or hardcopy materials created for the purposes of training under this work assignment become the property of the EPA (and shall be provided to the EPA WAM).

III. Deliverables

1) Schedule and complete training.

Schedule of Deliverables

Steps	**Completion Date**
Complete Task	Before September 30, 2013

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-13

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013	HD Vocational Vehicle Charact
	Base Option Period Number 1	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 2

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 03/28/2013 To 09/30/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
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5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Lauren Steele (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4788 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

STATEMENT OF WORK

A. EPA Contract:	EP-C-12-011
B. Work Assignment (WA):	WA 1-13
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Heavy-Duty Vocational Vehicle Industry Characterization
F. Work Assignment Managers (WAM)	Lauren Steele 734-214-4788 steele.lauren@epa.gov
G. Alternate WAM	Houshun Zhang 734-214-4214 zhang.houshun@epa.gov

Background

The U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) issued the first-ever program to reduce greenhouse gas (GHG) emissions and improve fuel efficiency of heavy-duty trucks and buses in 2011. This program was the first phase of a multi-stage GHG reduction approach. The first phase includes regulations for vocational vehicles, which are defined as all heavy-duty vehicles that are not heavy-duty pickup trucks, vans, or combination tractors. The agencies divided the vocational vehicle segment into three categories which align with the existing criteria pollutant standards for heavy-duty engines. The three categories are: light heavy-, medium heavy-, and heavy heavy-duty vehicles. Light heavy-duty vehicles are defined as Class 2b through 5, medium heavy-duty vehicles are Class 6 through 7, and heavy heavy-duty vehicles are Class 8 vehicles, based on the gross vehicle weight rating. Moving forward with the next phase, the agencies will consider appropriate ways to categorize the vocational vehicle segment. Under this work assignment, the contractor will develop an industry characterization of the heavy-duty vocational vehicle segment.

Purpose

The purpose of this work assignment is to provide a comprehensive, detailed industry characterization of heavy-duty vocational vehicles.

Tasks

The work required is divided into the two tasks below. The contractor shall contact the EPA WAM prior to beginning each of the tasks, as well as prior to engaging in any complicated data searches. The effort may necessitate the contractor contacting relevant companies. The contractor shall obtain approval from the EPA WAM prior to contacting any companies. The contractor shall not request similar information from more than nine (9) entities regarding this project.

Task 1: Vocational Vehicle Manufacturers

The contractor shall describe the U.S. heavy-duty vocational vehicle industry. The description shall include the chassis manufacturers and body builders of each vocational vehicle type, as listed in Table 1 below. In addition, the contractor shall identify, for each truck type listed: the fuel type (gasoline or diesel); engine manufacturer, engine displacement, engine configuration (I-6, V8, etc.), and engine rating in terms of rated power and speed; the transmission manufacturer, transmission model number and type (manual, automatic, automated manual), and number of gears; as well as axle configurations (number of axles) and axle ratios offered.

TABLE 1.

Category	Truck Types
Freight Delivery	Delivery Walk in & Conventional Vans
	Delivery Box Trucks
	Beverage and Food Trucks
	Tankers
	Armored Vehicles
	Car haulers
Housing and Construction	Concrete mixers
	Dump trucks
	Logging trucks
	Stake bed/Landscape trucks
	Truck Rentals
Municipal Services	Refuse and Recycling Trucks (identify side, front, and rear loaders separately)
	School buses
	Utility Trucks
	Tree trimmers
	Plow trucks
	Street Sweepers
Emergency Services	Transit, Paratransit and Shuttle buses
	Fire Trucks (aggregate pumper & aerial)
	Ambulances (include rescue fire trucks w/o PTO)

Category	Truck Types
	Tow/Recovery vehicles (aggregate RORO & boom)
	Recreational vehicles (motor homes)
Recreation & Travel	Motorcoaches
	Tow vehicles for recreational trailers

The contractor shall identify all U.S. companies in the sectors described in this task that would be considered small entities under the criteria at 13 CFR 121.201 set by the Small Business Administration (SBA). The SBA criteria are expressed for each NAICS code, either in number of employees or annual receipts in millions of dollars, unless otherwise specified. The number of employees or annual receipts indicates the maximum allowed for an entity and its affiliates to be considered small.

In addition to identifying those companies that qualify as small entities under the SBA criteria, the contractor shall separately identify those companies that the EPA considers to be small entities. For purposes of this work assignment, the EPA will generally consider heavy-duty vehicle manufacturers with 1,000 employees or less to be small entities.

Task 2: Vocational Vehicle Use

The contractor shall identify the primary type of purchaser (private company, municipality, or personal use) of each vehicle type, along with the average cost per new vehicle in 2012. If information is readily available, the contractor shall also determine the average number of miles accumulated annually for each vehicle type.

Deliverables

1. Quality Assurance Project Plan (QAPP). The contractor shall submit a draft QAPP to the EPA WAM within 10 days of Work Plan submission. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The EPA WAM shall review and comment on the draft QAPP. The contractor shall incorporate recommended changes and suggestions received before proceeding with technical work associated with the tasks contained in this work assignment. A final QAPP shall be submitted within 15 days after receipt of EPA comments. Information on completing a QAPP can be found at http://www.epa.gov/quality/at/extramural.html (general requirements) and /qatools.html (QMP/QAPP).

The final QAPP shall cover all aspects of this program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein.

2. Meetings. The contractor shall schedule a kick-off meeting with the EPA WAM prior to submission of the Work Plan. After submission of the Work Plan, the contractor shall hold weekly meetings with the EPA WAM by telephone conference. In these meetings, the contractor shall report progress, describe any new or unforeseen circumstances, and raise issues

regarding the execution of the work assignment. The EPA WAM shall respond to questions, provide information, and raise or clarify technical issues or provide technical direction.

3. Reports. The contractor shall prepare draft reports at the completion of each task identified in this work assignment, and submit these draft reports to the EPA WAM for review. After receiving EPA comments on draft reports for each task, the contractor shall prepare a single, unified final report that incorporates EPA's comments and any pertinent additional information available to the contractor. The contractor shall submit the final report two weeks after receipt of EPA's comments on the last draft report.

4. Schedule. The contractor shall collect information and prepare reports according to the following schedule:

Task	Date
Task 1 Draft Report	Two months after work plan approval
Task 2 Draft Report	Four months after work plan approval
Final Report	Two weeks after receipt of EPA comments

NON-DISCLOSURE AGREEMENT
All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-14

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	5 Peer Reviews MOVES2013

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Section 11

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 07/08/2013 To 09/30/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Kent Helmer (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4825 FAX Number: 734-214-4821
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

Contract Number EP-C-12-011 **Work Assignment WA1-14**

STATEMENT OF WORK

A. Issuing Office:	US Environmental Protection Agency
B. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
C. Title:	Five Peer Reviews in Support of MOVES2013
D. Work Assignment Manager: (WAM)	Kent Helmer, ASD-S89 2000 Traverwood Drive Ann Arbor, MI 48105 Tel: 734-214-4825 Fax: 734-214-4821 Email: helmer.kent@epa.gov
Alternate WAM:	William Aikman, ASD-S48 2000 Traverwood Drive Ann Arbor, MI 48105 Tel: 734-214-4597 Fax: 734-214-4821 Email: @epa.gov
Project Officer (PO):	Greg Janssen, ASD-S104 2000 Traverwood Drive Ann Arbor, MI 48105 Phone: 734-214-4285 Fax: 734-214-4821 Email: janssen.greg@epa.gov
E. Period of Performance:	June 10, 2013 – September 30, 2013

BACKGROUND

EPA's Office of Transportation and Air Quality (OTAQ) is tasked with setting out policy options to reduce ozone, PM, NO_2 and toxic emissions from light-duty vehicles (LDVs) in the US. As new policy options are brought forward, there is a need to evaluate the soundness and utility of any such policies. Models are generally used to address these questions, which may be too large to study directly but may yield to approximations from smaller sets of real data. Models

can provide insights into how drivers will change their vehicle operating patterns, for example, in response to a required increase in fuel economy across the LDV fleet.

EPA's proposed MOVES2013 model release is part of a comprehensive approach to address the impacts of light- and heavy-duty vehicles on air quality and public health. The five reports/analyses included here for peer review, document the result of various inquiries into the nature of fuel and vehicle emission interactions. Each report details how EPA will update MOVES ability to model policy outcomes from proposed changes to the US vehicle fleet and to help mitigate any adverse air quality impacts associated with future motor vehicle fuels. A further capacity of EPA's MOVES model is to estimate the impact on air quality of LDV fleet evaporative emissions.

CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this work assignment are consistent with the work authorized in Section 11 of the contract's statement of work.

All five reports/analyses shall be treated as confidential information for the course of the review and the materials are to stay within the knowledge of the contractor, peer reviewers and EPA staff. Authorization should be sought through the EPA Project Officer (PO) or Work Assignment Manager (WAM) to discuss the material outside of the context of the peer review(s).

SCOPE/ OBJECTIVES

EPA's peer review guidelines specify that all highly significant scientific and technical work products shall undergo independent peer review per specific agency protocols. To assure the use of the highest quality science in its predictive assessments, the contractor shall conduct an independent peer review of each of these products. By so doing, EPA seeks to assure its stakeholders that each analysis/study has been conducted in a rigorous, appropriate, and defensible way.

The contractor shall identify two peer reviewers for each of the five reports/analyses referenced in Appendix B from a pool of independent subject matter experts. The contractor shall facilitate each peer reviewer's review and comment.

TASKS

The Contractor shall be familiar with the provisions of the Peer Review Handbook to ensure that EPA's peer review guidelines are met. These guidelines, EPA's Science Policy Council Peer

Review Handbook, 3rd Ed., can be found at http://www.epa.gov/peerreview/ . Further, OMB's Information Quality Bulletin for Peer Review and Preamble (found in the EPA's Peer Review Handbook, Appendix B) contains provisions for the conduct of peer reviews across federal agencies and may serve as an overview of EPA's peer review process and principles.

A description of the work to be performed by the contractor in this Statement of Work follows.

Work Plan

The contractor shall prepare a work plan in accordance with the terms and conditions of the subject contract. It shall include an estimate of hours broken down by task and skill level and a detailed cost estimate. The contractor shall identify whether any potential conflict of interest exists for any part of this work assignment.

Task 1. Selecting Reviewer Candidates for Each Product Being Reviewed

The contractor shall develop a list of qualified subject matter experts from which to choose two candidate peer reviewers for each of the five reports/analyses. The contractor shall select two qualified independent reviewers to conduct a peer review for each report/analysis. The contractor shall then prepare and deliver to the EPA WAM a list that includes the names and affiliations of the selected peer reviewers, each peer reviewer's curriculum vitae or resume and a target start date for each candidate's peer review.

Each of the potential peer reviewers must be independent. EPA defines an "independent peer reviewer" as an expert who was not associated with the generation of the specific work product either directly by substantial contribution to its development or indirectly by significant consultation during the development of the specific product. The independent peer reviewer, thus, is expected to be objective. (For further information, see Sections 1.2.6 and 1.2.7 of EPA's Peer Review Handbook). In selecting reviewer candidates, the Contractor shall avoid those with actual or apparent conflict(s)-of-interest that would preclude an independent review. Sections 3.4.5 and 3.4.6 of the Handbook can be referenced for avoidance of conflict(s) of interest.

The contractor shall assume, for the purpose of estimating costs, that the documentation to review for each product consists of between 60 to 100 pages of material. It is anticipated that each peer reviewer will spend approximately 25 hours in analysis of the data, assumptions and conclusions, and in writing comments.

A list of known subject matter experts from academia and industry (see following - Appendix "A") has been included in this work statement as a suggested starting point from which to identify two reviewers to participate in each of the five peer reviews. The list shall not limit the contractor in the identification of potential reviewers but should serve as a "jumping –off point" for potential reviewers. The contractor shall contact subject matter experts and determine

whether each is able to perform the work during the period of performance. At all times, the contractor's personnel shall identify themselves as contractor employees and shall not represent themselves as EPA employees.

The contractor shall submit the name and resume or curriculum vitae of a final selected peer reviewer candidate to the EPA WAM for broad review. In addition, the contractor shall identify any actual, potential, or apparent conflicts of interest directly to the EPA Contracting Officer (CO). The EPA WAM may disagree with the applicable qualification requirements of the contractor's choice of a peer reviewer candidate. In such a case, the contractor shall identify an alternate from the pool of acceptable peer review candidates and forward details of that candidate to the EPA CO and WAM.

Acknowledgement of the peer reviewer candidates proposed will be provided by the EPA WAM in writing, via written technical direction. The contractor shall not commence peer review work on a particular report or analysis until such acknowledgement is received. To make the review process as credible as possible, the contractor shall **not** consult the EPA WAM in the determination of the final selection of peer reviewers.

Task 2. Facilitation of Each Peer Review

The EPA WAM will forward on to the contractor all the material for each particular review.

The contractor shall begin the actual peer review process by distributing a charge letter (EPA WAM will provide a list of suggested charge elements/directed questions for each product in Appendix "B") and all relevant documents to the peer reviewers. In the charge to the reviewers, an overall catch-all question shall be included at section end of any prescribed questions in order to capture other comments by the reviewers that were not outlined in the charge. The contractor shall assume that the peer review materials will be electronic and may be distributed by e-mail or FTP site.

Shortly after distributing the charge letter and supporting materials for a particular review product, the contractor shall arrange a teleconference between those peer reviewers it has identified in Task 1 above, the EPA WAM, EPA-identified relevant project-related staff and contractor staff to clarify any questions the peer reviewer(s) may have regarding the report/written materials. EPA may provide technical and/or background information on the particular report or analysis under review.

Future questions that a peer reviewer might have shall be directed back through the contractor for resolution through EPA's WAM. Any answer with regard to a particular peer review product and the question to which it refers shall, in turn, be shared with the full group of reviewers of that product. It is not necessary, however, that the peer reviewers jointly reach consensus on their

findings and recommendations since there may be limited overlap in the peer reviewers' areas of expertise and the charge questions on which a reviewer may choose to focus.

The contractor shall manage the peer review process to ensure that each peer reviewer has sufficient time to complete their review of the analysis or model by deadlines set forth in the deliverables schedule below. At the conclusion of each peer review initiated under this WA, the contractor shall gather all review comments to create a draft report of the conduct of each of the five peer reviews. After a brief comment period, EPA will return the draft reports to the contractor to create final versions of each of the individual peer review reports. The Contractor shall adhere to the provisions of EPA's Peer Review Handbook guidelines to ensure that the on-going peer reviews will conform to EPA peer review policy.

Task 3. Documentation of Each Peer Review Process

The contractor shall provide EPA WAM with a summary report detailing the means by which reviewers were chosen, the manner in which the review process was administered, and how the peer review was brought to a close. This report shall be included as part of the Final Technical Report detailed in Task 4. This document is in addition to copies of the reviewers' peer review reports and other supporting documentation, as detailed above.

A cover letter shall be provided with each peer reviewer's submittal. This cover letter shall clearly state the reviewer's name, the name and address of their organization, if applicable, and a statement of any real or perceived conflict(s) of interest. The contractor will forward these documents on to the WAM in electronic format along with any summary as detailed in Task 4 deliverables.

Task 4: Draft and Final Technical Report for Each Product Reviewed

For **each** report or analysis peer reviewed, the contractor shall develop both a draft and a final version of a technical report which details the work completed, including discussion of any issues encountered. The contractor shall prepare an introduction with a clear and concise overview of the comments made by the peer reviewers for that particular report or analysis. The draft final report shall include a written summary of all comments. The unedited reviewer comments shall also be submitted in the report along with the resumes/CVs and a signed Conflict of Interest statement from each reviewer. EPA will review each draft report and submit comments to the contractor.

The contractor shall provide EPA WAM with the final technical report for each product reviewed, addressing EPA comments, within one week of receiving comments on the draft copy. The report shall be sent electronically in both Microsoft Word (*.doc or *.docx) and Adobe portable document file (*.pdf) formats.

PROJECT STATUS/REPORTING

Weekly Updates: The contractor shall be available for a weekly meeting by teleconference between EPA WAM and contractor staff, if needed, to discuss any on-going issue(s) which may arise in the course of the peer review effort.

Teleconference calls: The Contractor shall provide status updates through phone teleconferences for the EPA WAM or his designated alternate on a bi-weekly basis to summarize the progress made to date. The contractor shall indicate progress achieved in the preceding period, technical issues encountered, solutions to issues (proposed or attempted), and project activity for the next two week period. This report shall include any potential issues or circumstances that arise causing delays in the review process. The contractor shall also report if the project is beginning to exceed the hours or dollars agreed upon in the work plan. The contractor shall initiate additional contact with the EPA WAM, as needed, to resolve questions and discuss any technical issues encountered.

Monthly Status Report: The contractor shall provide a written status report with the monthly invoice sent to EPA's Contracting Officer. The monthly status reports shall track the progress made on each of the tasks/deliverables for each of the products being reviewed. The report shall summarize hours and dollars expended, as well as projections to complete work, on each of the tasks as detailed in the SOW. The report shall include information such as task and subtask names, hours spent, contact information, task start date and deadlines, deliverables, accomplishments, any technical issues encountered, work on-hold status and whether the project is on schedule.

This report shall also include any potential issues or circumstances that may arise causing any delays in the review process. The EPA PO and WAM will notify the contractor in writing regarding any changes to the report format.

DELIVERABLES SCHEDULE

The contractor shall complete deliverables in accordance with the proposed schedule below.

Milestone/Deliverable by Task	Proposed Due Date**
Work Plan Preparation	• Deliver to EPA for approval, in keeping with IAW clauses
Task 1: Reviewer Selection • Peer reviewer selections for each panel • Begin contacting prospective panel members to finalize participation of members on each panel • Receive resumes; forward peer reviewer qualifications to EPA	• Two weeks after work plan approval
Task 2: Facilitation of Peer Review • Charge letter and documents to reviewers • "Kick-off" teleconference (each report/peer review) • Peer reviewer's comments due to contractor	• One week after agreement from any peer reviewer • Week of 07/08/2013 • Within one week of receipt of materials • 08/10/2013
Task 3: Documentation of Process • Draft report on documentation of process	• 08/31/2013 (combined with draft/Final deliverables)
Task 4: Draft and Final Technical Reports • Draft technical report • Final technical report	• 09/13/2013 • 09/27/2013

** These dates are subject to negotiation and change as a result of EPA's regulatory schedule, availability of the final Peer Review Charge and review documents, or other factors outside of the WAM's control.

Appendix A:

Lists of Potential Subject Matter Experts/Reviewers*

For each of the five products to be reviewed, the contractor may use the following lists of subject matter experts as a "jumping–off" point from which to assemble each group of candidate peer reviewers. The contractor may pursue individuals identified through the contractor's own resources or query EPA's WAM for additional suggested reviewers, as needed.

* Note: the following lists are not comprehensive.

Brake and Tire Wear/Temperature Effects Report:

Dr. H. Christopher Frey
308 Mann Hall
Department of Civil, Construction, and Environmental Engineering
North Carolina State University
Campus Box 7908
Raleigh, NC 27695-7908
Tele: 919-515-1155
frey@ncsu.edu

Matt Barth, Director
College of Engineering-Center for
Environmental Research and Technology (CE-CERT)
1084 Columbia Ave.
Riverside, CA 92507
University of California
Riverside, CA 92521
Tele: 951-781-5782
Fax: 951-781-5790
Dept: 951-781-5791
matt.barth@ucr.edu

Josias Zietsman, Div. Head
Texas A&M Transportation Institute (TTI)
Texas A&M University System
3135 TAMU
College Station, TX 77843-3135
Tele: 979-458-3476, ext. 83476
Fax: (979) 845-7548
zietsman@tamu.edu

Kevin Whitney, manager
Engine, Emissions & Vehicle Research Div. Southwest Research Institute
Office of Automotive Engineering
Engine & Vehicle R&D Department
Phone: (210) 522-5869
kevin.whitney@swri.org

Evaporative Emissions Report:

Chris Kite
Texas Council on Environmental
Quality (TCEQ)
Austin TX
Tele: (512) 239-1959
chris.kite@tceq.texas.gov

Wayne McMahon
California Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731
Phone: (818) 442-7411
Fax: (818) 575-6633
wmcmahon@arb.ca.gov

Jeff Long, manager
On-Road Light Duty Analysis Section
California Air Resources Board, PTSD/MSAB
9500 Telstar Avenue
El Monte, CA 91731
Telephone: (626) 450-6140

Fleet and Vehicle Activity Updates

Nancy A. McGuckin, travel behavior analyst
TravelBehavior.us
(323) 257-5144
Nancy@TravelBehavior.us

Maureen A. Mullen, Sr. Chemical Engr
TranSystems Corp.
1-800-835-4627
www.transystems.com

Lisa Aultman-Hall PhD, Professor
University of Vermont, School of Engineering & Transportation Research Center (Farrell Hall)
210 Colchester Avenue
Burlington, VT 05405
Tele: 802-656-1312
fax 860-656-9892
laultman@uvm.edu
(Dr. Aultman-Hall is a visiting scholar at the University of California Davis Institute for Transportation Studies for 2012-2013)

Song Bai, Scientist/Manager
Transportation Policy & Planning
Sonoma Technology, Inc.
1455 N. McDowell Blvd., Suite "D"
Petaluma, CA 94954-6503
Telephone: 707-665-9900
FAX: 707-665-9800
sbai@sonomatech.com

Fuel Effects, Hydrocarbons (HC), Toxics and Particulate Matter (PM) Speciation Analysis

Thomas D. Durbin, Research Engineer
(951) 781-5794
College of Engineering-Center for
Environmental Research and Technology (CE-CERT)
University of California-Riverside
Riverside, CA 92521
(909) 781-5797
(909) 781-5790 fax
tom.durbin@ucr.edu

Janet Yanowitz, P.E., Ph.D.
EcoEngineering, Inc.
Boulder, CO 80304
tele: 303-619-4346
Janet.Yanowitz@ecoengineer.net

Matti Maricq
Ford Motor Company
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Dearborn, MI 48121
Phone: (313) 594-7527
mmaricq@ford.com

Allen L. Robinson, professor
Carnegie Mellon University
Mechanical Engineering Dept.
5000 Forbes Avenue
Scaiffe Hall 420
Pittsburgh, PA 15213
Phone: (412)268-3657
Fax: (412) 268-3348
alr@andrew.cmu.edu

Heavy-Duty Engine Emissions Report (Diesel/Compressed Natural Gas/Gasoline/In-Use Verification Program/Drayage)

Matthew Thornton
National Renewable Energy Lab (NREL),
Center for Transportation
Technologies and Systems
Tele: 303-275-4273
matthew.thornton@nrel.gov

Mridul Gautam, Vice President Research
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West Virginia University
College of Engineering and Mineral Resources, ESB
Evansdale Drive, Room G-70
Morgantown, WV 26506-6106
Tele: (304) 293-5913
Fax: (304) 293-6689
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John M. Storey
Oak Ridge National Laboratory (ORNL)
FEERC
PO Box 2008 MS-6472
Oak Ridge, TN 37831-6472
Tele: 865-946-1232
Fax: 865-946-1248
storeyjm@ornl.gov

Dr. Mohamadreza Farzaneh, Ass't Res. Scientist
Center for Air Quality Studies
Texas Transportation Institute
1106 Clayton Lane, Suite 300E
Austin, TX 78723
(Texas A&M University System
College Station, Texas 77843-3135)
Tele: 512-467-0946
mfarzaneh@tamu.edu

Appendix B:

Elements to be Addressed in the Charge to the Peer Reviewers

This Appendix has been divided into five sections. Each section summarizes individually the products for which EPA has requested an independent peer review. This introduction contains a brief discussion of concerns which apply to all peer reviews across all products for review. The EPA WAM will forward to the contractor a list of questions, specific to each report or analysis, to be included in a charge letter directing peer reviewers to those issues of greatest concern to the Agency.

In their comments, reviewers should distinguish between recommendations for clearly defined improvements that can be readily made based on data or literature reasonably available to EPA and improvements that are more exploratory or dependent on information not readily available to EPA. Any comment should be sufficiently clear and detailed to allow a thorough understanding by EPA or other parties familiar with the analysis or the underlying data. Further, each peer review should address whether appropriate conclusions and implications can be drawn from either or both the study and any subsequent model predictions.

If a reviewer has questions about what is required in order to complete this review or needs additional background material, please direct the reviewer to contact the contractor's project manager for this effort. If a reviewer has a question about the EPA peer review process itself, please have the reviewer contact Ms. Ruth Schenk in EPA's Quality Office, National Vehicle and Fuel Emissions Laboratory by phone (734-214-4017) or through e-mail at schenk.ruth@epa.gov .

EPA requests that the reviewers not release the peer review materials or their comments to anyone else until the Agency makes its report and supporting documentation public.

Appendix B.1 **Brake & Tire Wear Emissions/Temperature Effects Report**

Summary: This report documents the data sources, assumptions and analyses used to derive particulate matter (PM) emission rates, both $PM_{2.5}$ and PM_{10}, from over-the-road vehicle brake and tire wear.

The report also includes updates to the MOVES model temperature adjustments applied to cold start and running emissions for criteria pollutants (HC, CO, NO_x and PM) due to vehicle starting and operation at colder ambient temperatures. New data are incorporated for cold start and running effects for HC, CO and PM exhaust emissions for Tier 2-compliant model year (MY) 2004 and later vehicles. This update also includes a re-analysis of HC and CO exhaust emissions for MY 2000 and later, "pre-Tier 2," vehicles.

The report may include one or two other small notes to light-duty MOVES concerns.

Estimated effort: approximately 12hours / 40 pages

Appendix B.2 **Evaporative Emissions Report**

Summary: This report incorporates new evaporative emission test data and several substantial changes to the model's evaporative emissions methodology. The update includes data from CRC (Coordinating Research Council) E-77 test programs, high evaporative emission field studies in Denver with the Colorado Department of Public Health and Environment (CDPHE) and an EPA 14-day diurnal testing program.

In the past, EPA has modeled evaporative emissions within MOVES by test procedure type: Running Loss, Hot Soak, Diurnal/Cold Soak and Refueling Loss. Now, evaporative emissions are modeled in MOVES according to physical processes: Permeation, Tank Vapor Venting, Liquid Leaks and Refueling Emissions.

With this update, the following changes are being incorporated into EPA's MOVES model:

- Explicit modeling of vapor leak prevalence rates;
    - New data being used to update both Hot and Cold (i.e., diurnal) Soak emission rates;
- Changes to Cold Soak emission rates, including multi-day diurnals;
- Adding fuel volatility and ambient temperature effects for running loss emissions;
- Improvements to MOVES altitude effects algorithm for tank vapor generation; and
- Credits which reflect recent updates to the model for I/M programs.

Estimated effort: approximately 16 hours / 50 pages

Appendix B.3 **Fleet and Vehicle Activity Updates**

Summary: This report documents changes to assumptions about the US national highway vehicle fleet population and activity data for the next version of the MOVES model. Fleet population and activity data is used to convert emission rates into emission inventory values and then is used to weight individual values into aggregated emission rates. The report also covers the techniques and methods used to map and distribute population and activity data into the categories used by the MOVES model.

Topics addressed by the report include:

- Default source use type data for the national highway vehicle population is being updated with vehicle registration data from Polk for calendar year 2012 and with usage data from the Vehicle Use and Inventory Survey (VIUS) for calendar years 2000, and later;
- Calendar year 2010 as a new base year from which any future population and activity scenarios are grown;
- Vehicle miles traveled (VMT) is being updated from recent Highway Performance Monitoring System (HPMS) data for the 2010 base year, using current DOE projections for future years;
- National default speed distributions by road type are being updated based on recent data obtained from a GPS (for passenger cars) provider; and
- Monthly motorcycle VMT distribution is being updated to better reflect the seasonal nature of motorcycle use.

Estimated effort: approximately 12 hours / 40 pages

Appendix B.4 **Fuel Effects, Toxics Emissions, Total Organic Gases (TOG) and Particulate Matter (PM) Speciation Analysis**

Summary: The report covers updated fuel effects to be applied in MOVES2013. Fuel effects include adjustments for selected fuel content and bulk fuel properties in gasolines containing up to 20% ethanol (data derived from EPA's EPAct Phase3 program), for gasoline fuel sulfur content (data derived from EPA's In-Use Fuel Sulfur Effects program) and for fuel ethanol content for E85 and similar blends (derived from EPA's EPAct Phase3 program, and additional sources). These adjustments are applied to vehicle exhaust criteria pollutants (HC, CO, NO_x and PM) and are used to estimate certain VOC species for vehicle start and running operation.

Secondly, the work covers updated calculations used to estimate exhaust emissions of selected air toxics as fractions of total VOC using results from EPA's EPAct Phase3 program. Depending on selected fuel properties, some fractions of VOC pollutant species in some vehicle classes are calculated as "complex" VOC fractions. Other VOC pollutant fractions for other compounds are calculated as "simple" VOC fractions; they do not vary with respect to fuel properties.

The toxics section also includes descriptions of methods used to estimate exhaust emissions of toxics species that are not modeled based on fuel properties, but are modeled from ratios (e.g., using emission speciation profiles) or by developing pollutant emission rates (e.g., mass/ distance) using general fuel properties (i.e., E0, E85) or vehicle technology groups. These other toxics include additional gaseous VOCs (not seen in MOVES Toxic Emissions Calculator), dioxins and furans, polycyclic aromatics hydrocarbons and metal species. Toxic speciation for diesel (pre and post-2007 technology) and vehicle evaporative emissions are also included.

Lastly, the report covers the incorporation of speciated total organic gas (TOG) and PM compounds into the MOVES model. TOG and PM speciation profiles, with additional $PM_{2.5}$ species, are being incorporated into MOVES to produce model-ready pollutant species emission numbers needed for AQ modeling, including 'lumped-species' defined by chemical mechanisms needed for TOG speciation. By incorporating speciation into MOVES, the model can account for important differences in speciation, including MY groups, fuel types (e.g., E0, E10, E85, diesel) and different emission processes (e.g., start, extended idle and running).

Two new PM speciation profiles are derived for this MOVES update, a light-duty PM gasoline profile and a conventional pre-2007 heavy duty PM profile. The derivation of a new gasoline profile is used to update the elemental carbon (EC) and organic carbon (OC) emission rates in the MOVES model for light-duty gasoline sources. The model update includes a new sulfate calculator which maintains a mass-balance of PM emissions with changes in sulfate emissions and models the sulfate emissions from both fuel and lubricating oil sources.

Estimated effort: approximately 24 hours / 120 pages

Appendix B.5 **Heavy-Duty Vehicle Emissions (including Diesel / Compressed Natural Gas / Gasoline / HD In-Use (Compliance and) Verification Program (IUVP) / Drayage) Report**

Summary: This report documents methods used in MOVES for evaluating current HD diesel NO_x emission rates using data from EPA's IUVP and Houston drayage programs. It includes updates to these emission rates, as well, based on comparisons to independent data.

The report covers methods and assumptions made on updating HD gasoline HC, CO and NO_x emission rates using the projected reductions to come from implementing the 2008 Heavy-Duty Gasoline Rule.

The report includes updated exhaust emission rates for compressed natural gas (CNG) transit buses, based on examination of currently available data and future projections for HC, CO, NO_x, PM and methane (CH_4) emissions.

Finally, the report includes a description of the methodology and data used to model crankcase emissions from heavy-duty engines. With the introduction of diesel particulate filters, the crankcase emissions contribute a larger portion of the total emissions from heavy-duty diesel engines. Updates to the crankcase emissions are also made to incorporate separate $PM_{2.5}$ speciation between tailpipe exhaust and crankcase emissions.

Estimated effort: approximately 14 hours / 46 pages

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-16

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Reducing Locomotive Emissions

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Tasks 5 and 12

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/03/2012 To 12/31/2012

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
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4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Joie Middlebrook (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4934 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Angela Lower (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2036 FAX Number:

Performance Work Statement
Title: Reducing Locomotive Emissions Workshop Facilitation and Report

Contractor: ICF	**Contract No.:** EP-C-12-011
Work Assignment (WA) Number:	**1-16**
Period of Performance (PoP):	**Effective Date – December 31, 2013**
Work Assignment Manager (WAM):	Joie Middlebrook 2000 Traverwood Drive Ann Arbor, MI 48105 **Phone:** 734-214-4934 **Email:** middlebrook.joie@epa.gov
Alternate WAM	Erik Herzog **Phone:** 734-214-4487 **Email:** herzog.erik@epa.gov
Project Officer (PO):	Greg Janssen 2000 Traverwood Drive Ann Arbor, MI 48105 **Phone:** 734-214-4285 **Email:** janssen.greg@epa.gov
Contracting Officer (CO):	Sandy Savage 26 West Martin Luther King Drive ***Mail Code:*** NWD1 Cincinnati, OH 45268 **Phone:** 513-487-2046 **Email:** savage.sandra@epa.gov

Although this WA will begin during the base period of the contract, the majority of the work will be performed during Option Period I, which commences October 1, 2012. Information on this Work Assignment is provided to enable the Contractor to prepare a Work plan for both contract periods. Contractor shall provide separate technical and cost proposals for work to be performed during each of the Periods of Performance.

Background and Purpose:
On December 7, 2011, President Obama and Canadian Prime Minister Harper announced the Regulatory Cooperation Council (RCC Joint Action Plan. Included in the RCC Joint Action Plan is the Locomotive Emissions Initiative – an initiative for Canada and the U.S. to work together to reduce greenhouse gas (GHG) emissions from locomotives.

As part of this initiative, a workshop will be held with industry experts to discuss technologies and options for reducing GHG emissions from locomotives. A Technology and Infrastructure Scan will form the basis for discussion.

The "North American Railways and Environmental Innovation: Reducing Locomotive Emissions Workshop" will be held from October 18-19, 2012 at the University of Illinois in Urbana, IL, following the 2012 Railroad Environmental Conference. The workshop will be hosted by Transport Canada and the Environment Protection Agency with the Railway Association of Canada and American Association of Railroads. Those participating in the workshop will be senior-level industry, government, and non-government officials with technical expertise on rail and environmental innovation.

The workshop will bring together railway industry operators, suppliers, researchers, consultants, and government officials to review and assess current, emerging and advanced technologies and practices that are intended to reduce GHG emissions from railway locomotives and railway operations. Participants will explore the technical, operational, policy, and program options to support innovation, research and development, and the uptake of advanced technologies.

Tasks and Deliverables:
Contractor shall provide all deliverables electronically, initially in draft form as detailed in the Tasks below. All materials must be in line with OPA guidelines and all web content shall comply with section 508 and other Office of Public Affairs (OPA) guidelines. The EPA WAM will review all deliverables in draft form and provide revisions and/or comments to the Contractor. The Contractor shall prepare the final deliverables incorporating the EPA WAM's comments.

Contractor personnel shall at all times identify themselves as Contractor employees and shall not present themselves as EPA employees. Furthermore, they shall not represent the views of the U.S. Government, EPA, or its employees. In addition, the Contractor shall not engage in inherently governmental activities, including but not limited to actual determination of EPA policy and preparation of documents on EPA letterhead.

Task 1 – Workshop facilitation and note taking
The Contractor shall facilitate the October 18-19 Locomotive Emissions Reduction workshop in Urbana, IL, including:

- Outline workshop objectives,
- Distribute materials to the participants,
- Oversee break-out sessions,
- Ensure that workshop agenda is followed,
- Encourage open discussion and participation by all attendees,
- Take notes of presentations and discussions,
- Prepare a summary of discussion results,
- Review summarized discussion results for workshop attendees.

The tentative agenda for the workshop is as follows:

Day 1
Welcome/Opening
Objectives outlined by facilitator
Presentation by Transport Canada's contractor re: technology report

Facilitated breakout discussion, (six or so groups, each discuss one topic, in turn, and summarize briefly before groups switch to next topic; by end, all six groups will have cycled through all six topics progressively)
Facilitator to take notes and summarize results 1st day

Day 2
Review summarized results
Facilitated breakout discussion, (same as day 1, working each technology through a criteria "grid" relating to feasibility, challenges, etc).
Facilitator to take notes and prepare draft summary of meeting results post-meeting

EPA WAM will provide the Contractor for the materials which will be distributed and discussed at the workshop.

Within two weeks of the workshop completion, the Contractor shall provide the WAM with all notes and summaries taken during the workshop, in EPA-standard, machine-readable format. These notes/summaries will be in draft format and are not intended to be an official report of the workshops.

The Contractor shall teleconference with the EPA WAM at least once every two weeks to clarify details of the workshop facilitation and note taking. If the EPA WAM is unavailable, the Contractor shall contact the EPA Alternate WAM with all issues and statuses.

Task 1 Deliverables	**Date**
Workshop facilitation, note taking, and summarization.	October 18-19
Workshop notes/summarization	Within two weeks of workshop completion

Travel

EPA anticipates that two Contractor personnel with attend the two-day workshop in Urbana, IL; one to facilitate and the other to take notes.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-17

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Aircraft CO2 Cost Analysis

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 6 Aircraft Analysis

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2012 To 07/31/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Bryan Manning (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4832 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

STATEMENT OF WORK

EPA Contract:	EP-C-12-011
Work Assignment (WA):	1-17
Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Aircraft CO_2 Cost Analysis for Technology Improvements to New In-Production Aircraft
Work Assignment Manager (WAM):	Bryan Manning 734-214-4832 manning.bryan@epa.gov
Alternate WAM	John Mueller 734-214-4275 mueller.john@epa.gov

BACKGROUND

At the 8th meeting of International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP) in February 2010, CAEP agreed to a future work program to establish aircraft CO2 standard(s) in 2013 (end of 2013). The CAEP Steering Group in 2010 agreed that the standard would apply to subsonic jets and turboprops. More specifically, the criteria were an applicability weight threshold of MTOW>5700kg (12566lb) for subsonic jet aeroplanes and a weight threshold of MTOW>8618kg (19000lb) for propeller driven multi-engine aeroplanes (turboprops). It was also agreed that the scope of applicability should include "new"[1] aeroplane types, but not "in-service", and that "new in-production"[2] aeroplane types should not be ruled out at this time. Further work is needed to inform future decisions regarding the applicability of the CO2 standard to new in-production aircraft. In particular, an assessment of the technological improvements to new in-production aircraft that are feasible and their corresponding (and potential) CO2 emission reductions and costs is needed.

In addition, the CAEP Steering Group in 2012 agreed to a CO2 metric (or form of the standard). This metric will help in assessing the relationship between the potential CO2 standard (based on the stringency options to be analyzed by CAEP) and technological improvements needed

[1] *"New" aeroplane types* - If airworthiness considers an aeroplane to be a "new" type, then this same perspective will be adopted by the CO2 requirement and the latest standard will be applied. This is a same approach to the current aeroplane noise requirements.
[2] "In-production" aeroplane types - aeroplane types which have already received a Type Certificate, and appropriate Production Certificate, and for which manufacturers either have existing undelivered sales orders or would be willing to accept new sales orders.

for new in-production aircraft to meet the CO2 standard. At this point CAEP has made no preliminary or final decisions on the numerical value or values of CO2 standards, but is now prepared to begin consideration of potential options for assessment of their technical feasibility, cost, and emission reduction potential.

Technical assistance for the assessment of technology and their costs for new in-production aircraft, as described earlier, is the subject of this statement of work. Under this statement of work, the contractor shall provide this technical assistance, and they shall provide a report of the results from this analysis. The contractor's technical expertise is critical to the success of the study. A more detailed description of the tasks required is given below.

DESCRIPTION OF TASKS

The contractor shall analyze the technology improvements that can be made to new in-production aircraft to reduce CO2 emissions and the costs of these improvements. The contractor shall provide a technical report to the EPA Work Assignment Manager (WAM) on the results of this assessment. This report shall include a description of any analysis the contractor conducts -- including methods used, sources of data, limitations, assumptions, etc. Before the contractor conducts any analysis, they shall provide to the EPA WAM (and consult with the EPA WAM about this item) a copy of their technical approach -- including the steps they plan to take in order to complete the analysis. The contractor shall not duplicate any work previously performed, but they are expected to rely upon it as a basis for this effort. EPA WAM will provide any previous work in this area to the contractor. The contractor shall meet with EPA WAM at the beginning of this effort.

Task 1. Identify Technology Improvements to New In-production Aircraft

The contractor shall identify and assess the technological improvements that are feasible for new in-production aircraft by category (as discussed below) and by model within category as deemed possible and appropriate. Aircraft (or airframe) efficiency gains are mainly achieved through aerodynamic drag and weight reduction. In addition, the contractor shall analyze any specific fuel consumption (sfc) improvements to aircraft engines. The contractor shall assess aerodynamic drag, weight, and engine sfc technology improvements or any other potentially feasible technologies and their absolute and percent CO2 emissions reduction -- for the time periods 2016 through 2020 and 2021 and later (recognizing that some technologies may not be available or feasible until later years). The contractor shall consult with the EPA WAM on potential alternative time periods before beginning work. The contractor shall identify specific time frames for the development, integration, and entry into service for particular aircraft technologies. The absolute and percent CO2 improvement shall be on a per-aircraft model basis (with per-engine estimates also specified for the aircraft). In addition, the contractor shall assess the interrelationships with other pollutants and noise associated with the technological improvements. Ultimately, the contractor shall describe the potential CO2 emissions reduction (and interrelationships) by technology and cumulatively for all technologies together (for the years specified above).

The contractor shall consider assessing technological improvements by aircraft categories (e.g., turboprop, business jet, regional jet, single aisle, small twin aisle, large twin aisle, and large

quad) when assessing emission reductions on a per-aircraft model basis. The contractor shall consult with the EPA WAM before analyzing the improvements by aircraft category.

The contractor shall consult with EPA WAM before deciding on which technology improvements to analyze and their methods for assessing emissions reductions for these technologies. The contractor shall provide a technical report on the results of this task.

Task 2. Cost Analysis of Technological Improvements for New In-Production Aircraft

The contractor shall assess the costs on a per-aircraft model and per-manufacturer basis (with per-engine cost estimates also specified for the aircraft) for individual technologies analyzed under Task 1 for the time periods 2016 through 2020 and 2021 and later. The contractor shall consult with the EPA WAM on potential alternative time periods before beginning work. The contractor shall provide the cumulative cost of utilizing these technologies (on a per-aircraft and per-manufacturer basis) for these same time periods.

Assuming CAEP develops stringency options to analyze for the CO2 standard during the period of this work assignment, the contractor shall assess the feasibility (technologies needed), costs, and emission reductions (from technology to achieve stringency option) associated with each of the stringency options. This assessment shall be conducted on both a per-aircraft and per-manufacturer basis (cost per aircraft and for each manufacturer to meet each stringency option; and emission reductions per aircraft and per manufacturer associated with these costs/technologies).

The contractor shall consider assessing costs of technological improvements by aircraft categories (e.g., turboprop, business jet, regional jet, single aisle, small twin aisle, large twin aisle, and large quad) when assessing costs on a per-aircraft basis. The contractor shall consult with the EPA WAM before analyzing the costs of improvements by aircraft category.

The contractor shall consult with the EPA WAM before deciding on their methods for assessing costs for these technologies (including consulting with the EPA WAM on the assessment of stringency options if CAEP decides on these options during the period of this work assignment). The contractor shall provide a technical report on the results of this task.

Task 3. Peer Review of Technical Report

The contractor shall identify at least two aircraft technology and cost experts to separately peer review this report. These experts should have substantial experience with assessing costs of new in-production technology, and they should be familiar with the ICAO/CAEP processes. The contractor shall have the peer review experts provide reviews of draft versions of the report (as well as the final report) so that there is an opportunity to revise the report based on the input from the peer reviewers. In addition, the contractor shall have the peer reviewers develop a memorandum summarizing their views of the draft versions of the report and the final report. Based on these memorandums and consultations with EPA WAM, the contractor shall provide a final technical report on the results of tasks 1 and 2.

The contractor shall consult with the EPA WAM before deciding on the peer reviewers.

DELIVERABLES

Kick off Meeting

Within one week after the WA is issued, but prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WAM to ensure a common understanding of the requirements, expectations, and ultimate end products.

Technical Reports and Memorandums

See Schedule section below for deadlines. The contractor shall provide the technical reports and memorandums for Tasks 1, 2, and 3 as described below. The contractor shall provide an electronic copy of all reports, memorandums, spreadsheets, supporting materials, etc. to the EPA WAM with the final report (by the deadline listed for the peer reviewers memorandum on the final report in the Schedule section).

Bi-Weekly Progress Reports

The contractor shall provide the EPA WAM brief bi-weekly status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the preceding weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

SCHEDULE

	Target dates
Initial Call (Kick off Meeting) with EPA WAM	10/10/12
Task 1 draft report submitted to EPA WAM	1/15/13
Task 1 comments received from EPA WAM	1/29/13
Task 1 draft report submitted to peer reviewers	2/12/13
Task 1 comments received from peer reviewers	3/12/13
Task 2 draft report submitted to EPA WAM	2/15/13
Task 2 comments received from EPA WAM	3/1/13
Task 2 draft report submitted to peer reviewers	3/15/13
Task 2 comments received from peer reviewers	4/12/13
Peer reviewers memorandum on draft report for Tasks 1 and 2	4/26/13
Task 1 final report submitted to EPA WAM	4/2/13
Task 1 final report comments received from EPA WAM	4/16/13
Task 1 final report submitted to peer reviewers	4/30/13
Task 1 final report comments received from peer reviewers	5/21/13
Task 2 final report submitted to EPA WAM	5/3/13
Task 2 final report comments received from EPA WAM	5/17/13
Task 2 final report submitted to peer reviewers	5/31/13
Task 2 final report comments received from peer reviewers	6/21/13
Final Report on Tasks 1 and 2	7/12/13
Peer reviewers memorandum on Final Report for Tasks 1 and 2	7/31/13

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-19

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Assessment of Infrastructure

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 1, Task 1c, Task 1d

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 11/15/2012 To 03/02/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
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Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Zoltan Jung (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4743 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

A. EPA Contract:	EP-C-12-011
B. Work Assignment:	WA 1-19
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Assessment of Infrastructure for Mid-Level Ethanol Blends
F. Work Assignment Manager (WAM):	Peter "Zoltan" Jung (734) 214-4743 Jung.zoltan@epa.gov
G. Alternate WAM:	Jeff Herzog 734 214-4227 herzog.jeff@epa.gov

I. BACKGROUND

EPA wishes to evaluate the way additional ethanol, which may be produced to comply with the RFS2 renewable fuel standards in the future might be accommodated at retail fueling facilities through the installation of equipment to dispense mid-level ethanol blends (E16-E50), E85 (E51-83), and E15. EPA is specifically interested in the type of retail equipment changes that might be made to store and dispense mid-level ethanol blends (E16-E50), E85 (E51-83), and E15 at retail, the cost of such equipment, and the extent to which existing retail equipment might be adapted for such use.

II. OBJECTIVE

The purpose of this work assignment is to assess infrastructure necessary at retail fueling facilities to dispense mid-level ethanol blends (E16-E50), E85 (E51-83), and E15.

III. SCOPE OF WORK

The Contractor shall perform the following tasks:

Task 1. Kickoff Meeting

Within seven (7) days of receiving the work assignment (WA) and prior to submittal of the Work Plan, the Contractor shall participate in a teleconference with the EPA WAM to ensure common understanding of the requirements, expectations, and end products.

Task 2. Perform Analysis

The Contractor shall conduct assessments as described below:

I. The Contractor shall conduct an assessment of components of infrastructure at retail. This assessment shall include the following elements:
   - (a) Summary description of existing retail fuel stations
     - i. Distribution of vehicle throughput & volume sales (gasoline & diesel)
     - ii. Distribution of number and size of underground tanks
     - iii. Distribution of number of fuel dispensers
   - (b) New fuel dispenser dedicated to dispensing E15
     - i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
     - ii. Estimate typical costs of the installation at a retail station
     - iii. Estimate time required for the installation at a retail station
     - iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)
   - (c) New fuel dispenser dedicated to dispensing 25 volume percent ethanol
     - i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
     - ii. Estimate typical costs of the installation at a retail station
     - iii. Estimate time required for the installation at a retail station
     - iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)
   - (d) New fuel dispenser dedicated to dispensing E30,
     - i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
     - ii. Estimate typical costs of the installation at a retail station
     - iii. Estimate time required for the installation at a retail station
     - iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)
   - (e) New fuel dispenser dedicated to dispensing E85,

i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
ii. Estimate typical costs of the installation at a retail station
iii. Estimate time required for the installation at a retail station
iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary descripton of existing retail fuel stations under Task 2.I.(a)

(f) New fuel dispenser that can dispense any mid-level ethanol blend ("blender pump")
i. Provide a list of all components that must be newly installed or modified
ii. Estimate typical costs of the installation at a retail station
iii. Estimate time required for the installation at a retail station
iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)

(g) Conversion or upgrading of existing equipment versus new equipment
i. List conditions under which conversion or upgrading may be preferable to new pumps
ii. Provide a description of changes that would be made
iii. Estimate costs and time requirements

(h) Provide description of all applicable legal/regulatory constraints and factors that would be considered at the federal, state, or local level
i. UST constraints
ii. UL constraints
iii. Permitting
iv. Any others that may be pertinent

(i) Safety issues
i. Describe safety issues for USTs holding E100
ii. Describe steps retailers must take to address safety issues
iii. Describe how these steps will affect initial capital or operational costs

II. The Contractor shall conduct an assessment of components of infrastructure upstream of retail. This assessment shall include the following elements:
(a) Describe changes that must be made upstream of retail
i. Assuming dedicated mid-level ethanol bend pumps at retail
ii. Assuming blender pumps at retail
(b) Status of research and pilot programs for ethanol pipelines

III. The Contractor shall evaluate the interplay between components and prices. This evaluation shall include the following factors:
(a) Factors that retailers will consider in deciding whether to make capital investments
i. What grants or other incentives are available (by state, region, federal, etc)?
ii. What payback period is a retailer looking for?

iii. Quantify payback as a function of ethanol blend price, volume sales, and other relevant factors

(b) Factors that retailers will consider in choosing which capital changes to make
   i. List conditions under which conversion/upgrading of existing pumps may be preferable to new pumps
   ii. List conditions under which dedicated pumps may be preferable to blender pumps

(c) How do the results of Tasks 2.III.(a) and 2.III.(b) differ for E15, E30 vs. E85?

IV. The Contractor shall make projections of infrastructure development and growth. The projections shall address the following elements:

(a) Quantify potential engineering limitations on growth in availability of mid-level blends
   i. Determine number of companies that install mid-level blend dispensing equipment
   ii. What is the fastest rate at which dispensing capability in the U.S. could be installed?

(b) Estimate the impact that the availability of FFVs would have on retailers' decisions to install new dispensing capabilities for mid-level blends

(c) Describe the time, cost, and other effort needed to reach
   i. 1.0 bill gal. of E15
   ii. 1.0 bill gal of ethanol sold as E85 by 2013
   iii. 2.0 bill gal of ethanol sold as E85 by 2014
   iv. 4.0 bill gal of ethanol sold as E85 by 2015

(d) Describe the price of E85 that would be needed to provide sufficient incentive to retailers to install dispensing equipment for the scenarios described in Task 2.IV.(c)

(e) To conduct the analysis, EPA expects that the Contractor will have to estimate the average annual ethanol content of E85, given seasonal and other requirements.

Task 3. Reports

The Contractor shall provide a Draft Final Report to the EPA WAM. Within 20 days of receiving comments from the EPA WAM, the Contractor shall provide a Final Report. Written products shall be delivered in electronic formats specified by the EPA WAM (e.g., Word, Excel).

IV. DELIVERABLES

1. Quality Assurance Project Plan (QAPP). The contractor shall submit a draft QAPP to the EPA WAM within 10 days of Work Plan submission. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The EPA WAM shall review and comment on the draft QAPP. The contractor shall incorporate recommended changes and suggestions received before proceeding with technical work associated with the tasks contained in this work assignment. A final QAPP shall be submitted within 15 days after receipt of EPA comments. Information on completing a QAPP can be found at http://www.epa.gov/quality/at/extramural.html (general requirements) and /qatools.html (QMP/QAPP).

The final QAPP shall cover all aspects of this program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein.

2. Bi-weekly Progress Reports. The Contractor shall provide the WAM with brief bi-weekly status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the concluded week, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the Contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution. The weekly progress report shall also include an estimate of the percentage of each task completed to date, and the resources (level of effort and cost) expended on each task.

3. Technical Reports. See Task 3.

4. Schedule of Deliverables.

Steps	**Completion Date**
Kick-off Meeting	Within 7 days of receipt of work assignment
QAPP Submission	Within 10 calendar days of Work Plan submission
Final QAPP	Within15 calendar days of receiving EPA comments
Draft Final report	January 2, 2013
Final report	Within 20 calendar days of receiving EPA comments

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-19

☐ Other ☒ Amendment Number: 000001

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Assessment of Infrastructure

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 1, 1c, 1d

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/15/2012 To 03/31/2013

Comments:
This work assignment Amendment 1 revises section "II." under Task 2 and extends the completion date for the draft final report.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
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Authorized Work Assignment Ceiling

	Cost/Fee:	LOE:
Contract Period: 02/01/2012 To 09/30/2013		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Zoltan Jung (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4743 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

A. EPA Contract:	EP-C-12-011
B. Work Assignment:	WA 1-19, Amendment 1
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Assessment of Infrastructure for Mid-Level Ethanol Blends
F. Work Assignment Manager (WAM):	Peter "Zoltan" Jung (734) 214-4743 Jung.zoltan@epa.gov
G. Alternate WAM:	Jeff Herzog 734 214-4227 herzog.jeff@epa.gov

This amendment modifies section "II." under Task 2 and extends the completion date for the draft final report.

I. BACKGROUND

EPA wishes to evaluate the way additional ethanol, which may be produced to comply with the RFS2 renewable fuel standards in the future might be accommodated at retail fueling facilities through the installation of equipment to dispense mid-level ethanol blends (E16-E50), E85 (E51-83), and E15. EPA is specifically interested in the type of retail equipment changes that might be made to store and dispense mid-level ethanol blends (E16-E50), E85 (E51-83), and E15 at retail, the cost of such equipment, and the extent to which existing retail equipment might be adapted for such use.

II. OBJECTIVE

The purpose of this work assignment is to assess infrastructure necessary at retail fueling facilities to dispense mid-level ethanol blends (E16-E50), E85 (E51-83), and E15.

III. SCOPE OF WORK

The Contractor shall perform the following tasks:

Task 1. Kickoff Meeting

Within seven (7) days of receiving the work assignment (WA) and prior to submittal of the Work Plan, the Contractor shall participate in a teleconference with the EPA WAM to ensure common understanding of the requirements, expectations, and end products.

Task 2. Perform Analysis

The Contractor shall conduct assessments as described below:

I. The Contractor shall conduct an assessment of components of infrastructure at retail. This assessment shall include the following elements:
   - (a) Summary description of existing retail fuel stations
     - i. Distribution of vehicle throughput & volume sales (gasoline & diesel)
     - ii. Distribution of number and size of underground tanks
     - iii. Distribution of number of fuel dispensers
   - (b) New fuel dispenser dedicated to dispensing E15
     - i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
     - ii. Estimate typical costs of the installation at a retail station
     - iii. Estimate time required for the installation at a retail station
     - iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)
   - (c) New fuel dispenser dedicated to dispensing 25 volume percent ethanol
     - i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
     - ii. Estimate typical costs of the installation at a retail station
     - iii. Estimate time required for the installation at a retail station
     - iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)
   - (d) New fuel dispenser dedicated to dispensing E30,
     - i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
     - ii. Estimate typical costs of the installation at a retail station
     - iii. Estimate time required for the installation at a retail station
     - iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)
   - (e) New fuel dispenser dedicated to dispensing E85,

i. Provide a list of all components (including fuel storage and other components in addition to the fuel dispenser itself) that must be newly installed or modified
ii. Estimate typical costs of the installation at a retail station
iii. Estimate time required for the installation at a retail station
iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)

(f) New fuel dispenser that can dispense any mid-level ethanol blend ("blender pump")
i. Provide a list of all components that must be newly installed or modified
ii. Estimate typical costs of the installation at a retail station
iii. Estimate time required for the installation at a retail station
iv. Estimate how components, costs, and time will differ depending on existing configuration of retail station as described in the summary description of existing retail fuel stations under Task 2.I.(a)

(g) Conversion or upgrading of existing equipment versus new equipment
i. List conditions under which conversion or upgrading may be preferable to new pumps
ii. Provide a description of changes that would be made
iii. Estimate costs and time requirements

(h) Provide description of all applicable legal/regulatory constraints and factors that would be considered at the federal, state, or local level
i. UST constraints
ii. UL constraints
iii. Permitting
iv. Any others that may be pertinent

(i) Safety issues
i. Describe safety issues for USTs holding E100
ii. Describe steps retailers must take to address safety issues
iii. Describe how these steps will affect initial capital or operational costs

II. The Contractor shall evaluate the extent to which the same tank trucks used to transport E10 can also be used to transport E85. The Contractor shall assume that all of the other necessary components of the fuel production and distribution infrastructure upstream of retail are in place to support compliance with the RFS2 volume requirements.

III. The Contractor shall evaluate the interplay between components and prices. This evaluation shall include the following factors:

(a) Factors that retailers will consider in deciding whether to make capital investments
i. What grants or other incentives are available (by state, region, federal, etc)?
ii. What payback period is a retailer looking for?
iii. Quantify payback as a function of ethanol blend price, volume sales, and other relevant factors

(b) Factors that retailers will consider in choosing which capital changes to make
    i. List conditions under which conversion/upgrading of existing pumps may be preferable to new pumps
    ii. List conditions under which dedicated pumps may be preferable to blender pumps
(c) How do the results of Tasks 2.III.(a) and 2.III.(b) differ for E15, E30 vs. E85?

IV. The Contractor shall make projections of infrastructure development and growth. The projections shall address the following elements:
(a) Quantify potential engineering limitations on growth in availability of mid-level blends
    i. Determine number of companies that install mid-level blend dispensing equipment
    ii. What is the fastest rate at which dispensing capability in the U.S. could be installed?
(b) Estimate the impact that the availability of FFVs would have on retailers' decisions to install new dispensing capabilities for mid-level blends
(c) Describe the time, cost, and other effort needed to reach
    i. 1.0 bill gal. of E15
    ii. 1.0 bill gal of ethanol sold as E85 by 2013
    iii. 2.0 bill gal of ethanol sold as E85 by 2014
    iv. 4.0 bill gal of ethanol sold as E85 by 2015
(d) Describe the price of E85 that would be needed to provide sufficient incentive to retailers to install dispensing equipment for the scenarios described in Task 2.IV.(c)
(e) To conduct the analysis, EPA expects that the Contractor will have to estimate the average annual ethanol content of E85, given seasonal and other requirements.

Task 3. Reports
The Contractor shall provide a Draft Final Report to the EPA WAM. Within 20 days of receiving comments from the EPA WAM, the Contractor shall provide a Final Report. Written products shall be delivered in electronic formats specified by the EPA WAM (e.g., Word, Excel).

IV. DELIVERABLES

1. Quality Assurance Project Plan (QAPP). The contractor shall submit a draft QAPP to the EPA WAM within 10 days of Work Plan submission. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The EPA WAM shall review and comment on the draft QAPP. The contractor shall incorporate recommended changes and suggestions received before proceeding with technical work associated with the tasks contained in this work assignment. A final QAPP shall be submitted within 15 days after receipt of EPA comments. Information on completing a QAPP can be found at http://www.epa.gov/quality/at/extramural.html (general requirements) and /qatools.html (QMP/QAPP).

The final QAPP shall cover all aspects of this program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein.

2. Bi-weekly Progress Reports. The Contractor shall provide the EPA WAM with brief bi-weekly status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the concluded week, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the Contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution. The weekly progress report shall also include an estimate of the percentage of each task completed to date, and the resources (level of effort and cost) expended on each task.

3. Technical Reports. See Task 3.

4. Schedule of Deliverables.

Steps	**Completion Date**
Kick-off Meeting	Within 7 days of receipt of work assignment
QAPP Submission	Within 10 calendar days of Work Plan submission
Final QAPP	Within15 calendar days of receiving EPA comments
Draft Final report	February 15, 2013
Final report	Within 20 calendar days of receiving EPA comments

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-19

☐ Other ☒ Amendment Number: 000002

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2016 Base Option Period Number 1	Infrastructure for Ethanol

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 1, 1c, 1d Fuel Distribution & Blending

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/15/2012 To 03/31/2013

Comments:
This work assignment amendment 2 extends the period of performance to April 30, 2013. No additional costs are expected as a result of this extension. No further action by the Contractor is required.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2016		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Zoltan Jung (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4743 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

A. EPA Contract:	EP-C-12-011
B. Work Assignment:	WA 1-19, Amendment 2
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Assessment of Infrastructure for Mid-Level Ethanol Blends
F. Work Assignment Manager (WAM):	Peter "Zoltan" Jung (734) 214-4743 Jung.zoltan@epa.gov
G. Alternate WAM:	Jeff Herzog 734 214-4227 herzog.jeff@epa.gov

This amendment extends the period of performance through April 30, 2013, at no additional cost.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-19

☐ Other ☒ Amendment Number: 000003

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Infrastructure for Ethanol

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 1, 1c, 1d Fuel Distribution and Blending

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/15/2012 To 04/30/2013

Comments:
This amendment revises the approved LOE by 350 hours from 1,564 hours to 1,914 hours at no cost to the Government. No further action by the contractor is required as a result of this amendment.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2013		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Zoltan Jung (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4743 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Angela Lower (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2036 FAX Number:

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-20

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Peer Review of a Refining Indu

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 1b(i) Refinery Modeling; Task 11 Peer Review

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 07/16/2013 To 09/30/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Contract Period:	Cost/Fee:	LOE:
	02/01/2012 To 09/30/2013		
This Action:			
Total:			

Work Plan / Cost Estimate Approvals

Contractor WP Dated:	Cost/Fee:	LOE:
Cumulative Approved:	Cost/Fee:	LOE:

Work Assignment Manager Name: Lester Wyborny (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4473 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

A. EPA Contract:	EP-C-12-011
B. Work Assignment (WA):	1-20
C. Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E. Statement of Work:	Peer Review of a Refining Industry Cost Model
F. Work Assignment Manager (WAM):	Lester Wyborny, wyborny.lester@epa.gov, (734) 214-4473
Alternate WAM:	Russ Smith, smith.russ@epa.gov, (202) 343-9996

Introduction

Under a regulatory program called Tier 3, the Environmental Protection Agency (EPA) is planning to finalize regulations that would further reduce emissions of ozone-forming pollutants from cars and trucks. The Tier 3 final rulemaking will include lowering gasoline sulfur from the current 30 ppm to a lower average standard, most likely 10 ppm. EPA created a U.S. refining industry refinery-by-refinery cost model to estimate the cost of further gasoline sulfur control. This cost model is contained in an Excel spreadsheet, and estimates the cost of controlling gasoline sulfur levels refinery-by-refinery in the U.S. Using a spreadsheet model was preferred to using a linear programming (LP) refinery model because it allows us to better understand the gasoline sulfur control costs to individual refineries, and how costs would be affected by an averaging, banking and trading (ABT) program.

The version of the refinery-by-refinery cost model that was created for the proposed Tier 3 rulemaking (78 FR 29816, May 21, 2013) was peer reviewed. Assessment of the peer review comments led to the conclusion that the recommended changes would not result in significantly different costs than those which we estimated for the Tier 3 proposed rulemaking cost analysis. EPA has since incorporated other changes to the refinery-by-refinery cost model that should improve its ability to model the operations of U.S. refineries, and thus better estimate the costs of the Tier 3 sulfur reductions. The nature of the changes to the model thus necessitates another round of peer reviews. The purpose of this work assignment is to secure three independent peer reviews of the improved version of the refinery-by-refinery cost model.

Tasks

The contractor shall provide three independent peer reviewers to separately assess the refinery-by-refinery cost model. Each peer reviewer shall be a refinery modeling expert (or otherwise be a demonstrated subject matter expert in refining and refining technologies). Each peer reviewer shall have significant knowledge of and skill in using Excel spreadsheets. Because the refinery-by-refinery cost model contains confidential information, the contractor and each peer reviewer shall – prior to receiving the model – demonstrate the ability to maintain the confidentiality and security of the data.

The contractor shall follow the EPA's peer review guidelines set forth in EPA's Science Policy Council Peer Review Handbook, 3rd Ed. which can be found at http://www.epa.gov/peerreview/. Further, OMB's Information Quality Bulletin for Peer Review and Preamble (found in the EPA's Peer Review Handbook, Appendix B) contains provisions for the conduct of peer reviews across federal agencies and may serve as an overview of EPA's peer review process and principles.

Task 1. Selection of Peer Reviewers

The contractor shall identify 3 independent peer reviewers with refinery and Excel spreadsheet expertise that are available to provide the review in the deliverables time frame. EPA defines an "independent peer reviewer" as an expert who was not associated with the generation of the specific work product either directly by substantial contribution to its development or indirectly by significant consultation during the development of the specific product. The independent peer reviewer, thus, is expected to be objective. (For further information, see Sections 1.2.6 and 1.2.7 of EPA's Peer Review Handbook).

In selecting reviewer candidates, the Contractor shall avoid those with actual or apparent conflict(s)-of-interest that would preclude an independent review. Sections 3.4.5 and 3.4.6 of the Handbook can be referenced for avoidance of conflict(s) of interest. In addition, the contractor shall identify any actual, potential, or apparent conflicts of interest directly to the EPA Contracting Officer (CO).

The contractor shall provide the EPA WAM with a curriculum vitae or resume (indicating refinery and refinery modeling expertise) for each peer reviewer. The EPA WAM may disagree with the applicable qualification requirements of the contractor's choice of a peer reviewer candidate. In such a case, the contractor shall identify an alternate and forward details of that candidate to the EPA WAM. To make the review process as credible as possible, the contractor shall **not** consult the EPA WAM in the selection of peer reviewers.

Task 2. Facilitation of Peer Review

The contractor and each peer reviewer shall describe the means of maintaining data security and confidentiality. Upon satisfactory demonstration of such means, the EPAWAM will provide the refinery cost model and relevant materials to the contractor for the review.

Prior to commencement of peer reviews, each selected peer reviewer shall have a conference call

with EPA staff[1] to receive a verbal description of the refinery-by-refinery cost model (Appendix B provides a general discussion of the refinery-by-refinery cost model). The purpose of this call will be to help the contractor understand the inner workings of the model. This review will be interactive allowing the contractor to ask any questions about the refinery-by-refinery cost model.

Each peer reviewer shall review and assess the refinery-by-refinery cost model. The comments and responses from the prior round of peer reviews will be provided to the contractor as additional reference materials. "Appendix A – Background on the First Peer Review" provides the principal assessment points of the first peer review. Where there has been no change to that particular part of the refinery model, it is not required that that part of the model be re-assessed (although it is not discouraged if the reviewer believes that it is important to do so). Each peer reviewer shall review and assess any portion of the refinery model that has been changed since the first peer review. In addition, each peer reviewer shall:

A. Review the methodology for estimating the volume of of light and heavy straight run naphtha which is based on a regression analysis of the API gravity and light straight run fraction from the assays of 12 crude oils. (This replaced the previous method of relying on similar correlation for the average quality of crude oil refined in each PADD.)

B. Review the methodology of basing the refinery blendstock volumes for the reformer, alkylation unit, isomerization unit, aromatics unit and the naphtha hydrotreater on actual throughput volume data from the Office of Air Quality Planning and Standards (OAQPS). OAQPS requested, and the Office of Management and Budget (OMB) approved, the collection of refinery operations data by OAQPS from refiners which included throughput data for many refinery units. The data collected by OAQPS was for the year 2010. (Previously we were using projected PADD-average use estimates by an LP refinery modeling run made by Mathpro in the year 2004 for the MSAT2 cost analysis.)

C. Comment on EPA incorporating, and how EPA incorporated in its refinery-by-refinery cost model, refiner plans for complying with the Mobile Source Air Toxics rulemaking to reduce the content of benzene in their gasoline. This affected the volume of benzene precursors sent to the reformer or the volume of benzene extracted from the gasoline pool.

D. Review the methodology applied by EPA to estimate that refiners are maximizing propylene production at the expense of FCC naphtha production. Using refinery-by-refinery propylene sales information provided by EIA, EPA estimated that higher amounts of propylene production compared to the feedstock volume to the FCC unit would have caused lower FCC naphtha production.

E. Comment on EPA's methodology of forcing each refinery's gasoline volume modeled by the refinery-by-refinery cost model to match actual refinery gasoline production volume as reported by refiners to EPA. In trying to match individual refinery gasoline volumes, we use the practice of undercutting FCC naphtha and heavy naphtha into the diesel and jet fuel pools. Since we often had mismatched gasoline volumes in those refineries with

1 We estimate that each conference call with each peer reviewer will take between one and one and one half hours.

hydrocrackers, we also estimate hydrocracker operation (naphtha, intermediate, or diesel modes) as a means to match gasoline volumes. More often than not, heavy naphtha volumes tend to exceed reformer throughput volumes, so for those refineries that have excessive gasoline volumes, we assume that the excessive heavy naphtha volume is sold. For refineries with insufficient gasoline volume, this excess heavy naphtha volume is assumed to be blended into gasoline (but not reformed). In a couple of cases, where there is a large shortfall in feedstock for reformers we assume that the heart cut of the FCC naphtha is being sent to the reformer for producing more aromatics for aromatics extraction.

F. Review the new data received from vendors and how EPA is using that data. As suggested by the first peer reviewers, we requested and obtained more information from vendors of gasoline desulfurization equipment and included this information in the final rule cost analysis. The vendors confirmed that the hydrogen consumption values that they reported were actual, not stoichiometric.

G. Review the methodology EPA used to adjust desulfurization costs to account for the cases when a refinery's modeled desulfurization situation differed from the typical case for which the vendors provided us information. For example, for reducing a refinery's gasoline sulfur from 30 ppm to 10 ppm, the refiner would typically need to reduce its FCC naphtha from 75 to 25 ppm. Depending on the amount of FCC naphtha blended into its gasoline, the amount of sulfur control that the refiner would need to achieve in its FCC naphtha could be larger or smaller than this. We linearly adjusted the desulfurization cost to account for the variances from the typical case.

H. Review the methodology EPA used to adjust desulfurization costs to account for situations where the level of desulfurization increases above a certain point that causes the desulfurization cost to be increase substantially in a nonlinear manner, thus the costs begin to increase exponentially. If we did not make this adjustment, we believe that we would be underestimating the cost for those refineries which must achieve a very high percentage of desulfurization.

I. Review and comment on the conclusions that EPA reached through a conversation with technical experts that extractive treating of butane is widely practiced today by refiners and that the sulfur level of butane is under 5 ppm. Thus, no additional desulfurization needs to occur for butane. Also, between a review of crude oil assays and the follow-up discussion with technical experts, it was concluded that extractive treating of light straight run naphtha (LSR) from sweeter crude oils will yield a low sulfur level in that stream that would not require additional desulfurization under Tier 3. However, even after extractive treating of LSR from more sour crude oils, LSR could still contain greater than 10 ppm sulfur that refiners may find too high under Tier 3 (this assumes that the LSR is being blended straight to gasoline instead of being hydrotreated before being isomerized).

J. Ensure the integrity of the new calculations (added since the first peer review) in the refinery-by-refinery cost model by working through those equations in the spreadsheet. Check the new equations with sufficient frequency (i.e., one refinery in each PADD) to ensure that the refinery model formulas refer to the appropriate cells. Report any errors.

The contractor shall manage the peer review process to ensure that each peer reviewer has sufficient time to complete their review of the model by deadlines set forth in the deliverables schedule below. Future questions that a peer reviewer might have shall be directed back through the contractor for resolution through EPA's WAM. It is not necessary that the peer reviewers jointly reach consensus on their findings and recommendations.

Task 3. Documentation of Peer Review Process

The contractor shall provide EPA WAM with a summary report detailing the means by which reviewers were chosen, the manner in which the review process was administered, and how the peer review was brought to a close. This report shall be included as part of the Final Report detailed in Task 4. This document is in addition to copies of the reviewers' peer review reports and other supporting documentation.

A cover letter shall be provided with each peer reviewer's submittal. This cover letter shall clearly state the reviewer's name, the name and address of their organization. The contractor shall forward these documents on to the EPA WAM in electronic format along with any summary as detailed in Task 4 deliverables.

Task 4. Draft and Final Reports

Each peer reviewer shall prepare a draft and final report of their analysis of the refinery-by-refinery cost model. At the conclusion of each peer review initiated under this WA, the contractor shall gather the draft reports and submit them to the EPA WAM in Microsoft Word format for review and comments. Each draft report shall include a written summary of all comments. The unedited reviewer comments shall also be submitted in the report along with the resumes/CVs and a signed Conflict of Interest statement from each reviewer. EPA will review each draft report and submit comments to the contractor. Each peer reviewer shall then prepare a final report incorporating any EPA verbal or written comments on the draft report. The contractor shall provide EPA WAM with the final report for each peer review, addressing EPA comments, within one week of receiving comments on the draft copy. The report shall be sent electronically in Adobe portable document file (*.pdf) formats. The Contractor shall adhere to the provisions of EPA's Peer Review Handbook guidelines to ensure that the on-going peer reviews will conform to EPA peer review policy.

Deliverables

1. Quality Assurance Project Plan (QAPP). No QAPP is required for this work assignment.

2. Meetings. The contractor shall schedule a kick-off meeting with the EPA WAM prior to submission of the Work Plan. After submission of the Work Plan, the contractor shall hold weekly meetings with the EPA WAM by telephone conference. In these meetings, the contractor shall report progress, describe any new or unforeseen circumstances, and raise issues regarding the execution of the work assignment. The EPA WAM shall respond to questions, provide information, and raise or clarify technical issues or provide technical direction.

3. Schedule of Deliverables.

Steps	**Completion Date**
Kick-off Meeting with Contractor	Within 7 days of receipt of work assignment
Teleconference with each Peer Reviewer and Contractor	Within 2 weeks of Kick-off Meeting
Complete Model Review	Within 3 weeks of work plan approval
Draft report to EPA	Within 4 weeks of work plan approval
Final report	Within 1 week of receiving comments from EPA

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

Appendix A
Background on the First Peer Review

For the first round of peer reviews, the requirements for the peer reviewers were as follows:

a. Review and comment on the overall design of the refinery-by-refinery cost model for estimating the cost of sulfur control, including:

- The means for modeling each refinery's operations, including their gasoline volume and sulfur level as tools for calibration;
- The use of FCC naphtha desulfurization equipment as the most cost-effective means for reducing gasoline sulfur levels; and
- How the refinery-by-refinery cost model could be improved.

b. Review and comment on the inputs for the various desulfurization technologies from the information that they provided to EPA to ensure that they are being represented adequately to correctly estimate the desulfurization costs (EPA staff will provide the vendor information to the contractor).

c. Review and comment on the sulfur levels assigned to each gasoline blendstock.

d. Review and comment on the assumption that some refiners will need to desulfurize their light straight run (LSR) to comply with lower sulfur gasoline.

e. Review and comment on EPA's method for estimating the blendstock volumes for each refinery.

f. Ensure the integrity of the refinery-by-refinery cost model by working through the equations present throughout the spreadsheet. Check the equations throughout the spreadsheet with sufficient frequency (e.g., one refinery in each PADD) to ensure that the refinery model formulas refer to the appropriate cells. Report any errors.

Appendix B
Description of the Refinery Cost Model

The purpose of the refinery-by-refinery cost model is to project how each refinery would reduce the sulfur in its gasoline pool down to 10 ppm or 5 ppm and estimate the cost for doing so. For most refineries, we expect that refiners will primarily or exclusively lower the sulfur in the FCC naphtha to comply with a 10 ppm gasoline sulfur standard. To estimate the cost for each refinery to lower its gasoline pool down to 10 ppm, we estimated the current FCC naphtha volume and sulfur level for each refinery and the amount of sulfur reduction in the FCC naphtha to that which would enable each refinery to meet a 10 ppm sulfur standard.

Each refinery's FCC naphtha sulfur level can be estimated by knowing its volume, the volume of each of the other gasoline blendstocks that comprises each refinery's gasoline pool, the sulfur levels of the other gasoline blendstocks, and the average sulfur level of each refinery's gasoline pool. The calculation is summarized below:

FCC Naphtha Sulfur ppm = ((A*B) –
(C*D+E*F+G*H+I*J+K*L+M*N+O*P+Q*R+S*T)) / Z

Where:

A = Refinery Total Gasoline Yield, BPSD
B = Refinery Total Gasoline Sulfur level, ppm
C = Butane to Gasoline, BPSD
D = Butane Sulfur, ppm
E = Alkylate BPSD
F = Alkylate Sulfur, ppm
G= Reformate BPSD
H= Reformate Sulfur, ppm
I = Coker Naphtha, BPSD
J = Coker Naphtha Sulfur, ppm
K= Hydro-crackate BPSD
L= Hydro-crackate Sulfur, ppm
M= Light Straight Run (LSR) and Natural Gas Liquids (NGL), BPSD
N =LSR and NGL Sulfur, ppm
O= Dimersol, BPSD
P= DimersolSulfur, ppm
Q= Polymerization BPSD
R= Polymerization Sulfur, ppm
S= Ethanol, BPSD
T = Ethanol Sulfur, ppm
Z= FCC Gasoline Yield, BPSD

For estimating the production volumes for each refinery's gasoline blendstocks in the U.S, we relied on refinery unit throughput data. In the case of the FCC unit, coker and hydrocracker units, we obtained feedstock throughput volumes from EIA for each refinery. Since these units

produce other products besides gasoline blendstocks, we estimated the portion of the production volume which is a gasoline blendstock. In the case of hydrocrackers, we estimate if the hydrocrackers are operating in a diesel or naphtha mode, or a mode inbetween. The operating mode is estimated based on whether the volume of gasoline estimated by the refinery model is higher or lower than actual production volumes. For several other refinery units, including the reformer, the alkylation unit, the isomerization unit and aromatics plants, we used throughput data that was provided by refiners to the Office of Air Quality Planning and Standards (OAQPS). In the case that we needed to resort to capacity data instead of throughput data (this was needed in the case that a refinery modified its refinery to refine a lower quality crude oil), the refinery capacities we used are based on 2011 Oil and Gas Journal (OGJ) and Energy Information Administration (EIA) information for unit capacities.

The volume of light straight run, which is the light naphtha portion of the total volume of crude oil which is distilled by the atmospheric crude oil column, is estimated to be a fraction of the total volume and API gravity of the crude oil processed by each refinery. While the volume of reformate is fixed by the reformer throughput volume, we also estimated the heavy naphtha production volume by each refinery's crude oil volume and quality.

We also needed the total gasoline volume for each refinery. Although we could estimate the volume of gasoline produced by each refinery based on the estimated volumes of each gasoline blendstock, in this case we have actual gasoline production volume data reported by refiners for each refinery. As a part of complying with the Reformulated Gasoline program, refiners report gasoline volumes for reformulated and conventional gasoline volume and quality information to EPA. To the extent possible, we forced each refinery to match the actual gasoline production volume at each refinery.

For the gasoline blendstocks other than the FCC naphtha, we estimated the sulfur levels for each of these blendstocks. The table below provides our estimate for the sulfur levels for each gasoline blendstock that we estimated was being produced by U.S. refineries.

Table 3: NonFCC Gasoline Blend Stock Sulfur Levels

Gasoline Blend stock	Sulfur Level, PPM
Butane	10
Alkylate	5
Reformate	1
Coker Naphtha	2
Hydrocrackate	8
LSR and NGL	43
Dimersol	3
Polymerization	1
Ethanol	3

With the estimates for the gasoline blendstock volumes and the sulfur levels for those blendstocks and having the total gasoline volume and sulfur levels for each refinery's gasoline, the FCC naphtha sulfur levels could then be estimated. The FCC naphtha sulfur levels ranged from about 30 ppm to 150 ppm.

After we had estimated the starting sulfur level of the FCC naphtha for each refinery and sulfur level reduction needed to bring each refinery's gasoline sulfur level down to 10 ppm, we could begin the effort to estimate the cost of that sulfur reduction. Each refiner which installed an FCC naphtha desulfurization unit to comply with Tier 2 (30 ppm sulfur level) is likely to use the same vendor's technology to comply with a more stringent sulfur standard, and we made this assumption in the refinery-by-refinery cost model. To determine which vendor's FCC naphtha desulfurization technology is installed in each refinery to comply with Tier 2, EPA conducted a literature search. The various FCC naphtha desulfurization technologies that we identified that refiners used to comply with Tier 2 are Axens' Prime G and Prime G+, Exxon's Scanfining I or II, CDTech's CD hydro and CDHDS, Szorb and UOP's Selectfining. Also, other refiners relied solely on FCC feed hydrotreating technologies to comply with the 30 ppm Tier 2 sulfur standard. For the small group of refineries which do not have an FCC unit and therefore don't produce any FCC naphtha, there wasn't any need to estimate any cost for FCC desulfurization hardware to comply with the 30 ppm sulfur standard, though these refiners may need to add LSR hydrotreating capacity.

To estimate the cost for achieving the necessary sulfur reduction for each vendor's technology, we contacted each of the above-mentioned vendors and asked them for the information that we would need for estimating the cost incurred to further lower gasoline sulfur levels. From each vendor we asked that they provide an estimate of the capital cost, the utility demands (including the electricity and natural gas demand) and the hydrogen consumed for desulfurizing a refiner's FCC naphtha from 75 ppm down to 25 ppm. We estimated using a preliminary version of this spreadsheet that a typical refinery would have had to reduce its FCC naphtha down to 75 ppm to comply with the 30 ppm Tier 2 sulfur standard, and would have to bring its FCC naphtha down to 25 ppm to achieve 10 ppm sulfur in its gasoline pool. We also asked for information for desulfurizing a refinery's FCC naphtha down to 10 ppm which would allow a typical refinery to comply with a 5 ppm sulfur standard. Since refineries are quite diverse in the level of sulfur of the crude oil that they refine and how they are configured, we requested a range of desulfurization information from each vendor that would allow us to estimate the desulfurization costs for the diversity of US refineries.

An important aspect of the diverse range of information that we requested from the vendors is to provide the desulfurization costs for the cases that FCC naphtha exiting the FCC unit is high in sulfur (2500 ppm), low in sulfur (200 ppm), in addition to being average in sulfur (800 ppm). If the sulfur level of FCC naphtha is higher (i.e., 2500 ppm) coming out of the FCC unit, the existing Tier 2 FCC naphtha desulfurization unit would already be working very hard and would be challenged to further lower the sulfur of the FCC naphtha in that unit. Conversely, if the FCC naphtha exiting the FCC unit is very low in sulfur, the existing FCC naphtha desulfurization unit would not be working very hard to meet the Tier 2 sulfur standard and it would likely have plenty of headroom to lower FCC naphtha sulfur levels without additional capital investments.

Finally, we requested desulfurization information from the vendors for the case that a refiner is solely using a FCC feed hydrotreater to comply with Tier 2, and does not have a FCC naphtha hydrotreater today. For this situation, we believe that these refineries would likely add a grassroots FCC naphtha hydrotreater because many FCC feed hydrotreaters are insufficient to

achieve a very low gasoline sulfur such as the 10 ppm Tier 3 sulfur standard which EPA is likely to finalize.

We entered the data provided by the vendors into our refinery-by-refinery cost model. With some input from vendors, we developed a means to adjust the desulfurization cost for each refinery to reflect the level of desulfurization of the FCC naphtha that each refinery would need to achieve to comply with the proposed Tier 3 sulfur standard. We also developed a means to account for the higher costs of achieving a higher percentage sulfur reduction than that which the vendors provided since higher percentages of desulfurization are associated with higher desulfurization costs.

In addition to having to treat their FCC naphtha, we estimate that some refiners would need to desulfurize their light straight run naphtha (LSR) to cost effectively comply with a 10 ppm sulfur standard. In many cases, refiners are already extracting the sulfur out of their LSR or hydrotreating their LSR in a naphtha hydrotreater before feeding their LSR to an isomerization (isom) unit (see Table 3 for our estimate of the sulfur level for Isom) and this is sufficient for complying with Tier 3. However, refineries that are refining a sour crude oil slate and do not have isom units may need to hydrotreat its LSR to comply with Tier 3. To estimate if a refinery may need to add hydrotreating for their LSR stream, we assess whether the naphtha hydrotreater has sufficient capacity to hydrotreat the LSR in addition to the heavy naphtha that needs to be hydrotreated before it is reformed. We similarly assessed whether the FCC postreater had additional capacity to treat the LSR in addition to the FCC naphtha.

We estimate that if a refiner has ample hydrotreating capacity available in their FCC naphtha post hydrotreater or reformer naphtha hydrotreater, then the refiner will hydrotreat their LSR in these units. If the naphtha hydrotreater or FCC naphtha post hydrotreater does not have sufficient capacity to also treat the LSR, and extractive desulfurization is insufficient to being LSR sulfur levels to a low enough level, a refiner will add LSR hydrotreating capacity to treat that volume of LSR which we assume is not already being hydrotreated. If a refiner needed additional LSR hydrotreating capacity, the naphtha hydrotreater was revamped to accommodate the increased feed volumes, although a revamp was not considered possible if the new additional capacity exceeded 30% of the reformer max charge rate. For refiners needing additional capacity that exceeded this criterion, we added new naphtha hydrotreater treating capacity, solely for processing LSR. We used design estimates to derive the costs for the LSR hydrotreater additions, using Petroleum refining handbooks.

The price for utilities (natural gas and electricity) used in the refinery cost model are from the early release version of the 2013 Annual Energy Outlook (AEO).

The refinery-by-refinery cost model is a large Excel file comprising over a dozen worksheets. Throughout the spreadsheet there are about 600 columns of data and approximately 650 columns of calculations. Many of the columns of data and calculations are for each of the approximately 120 refineries which produce gasoline; however, on some worksheets, the columns of data or calculations are more limited.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-21

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013	Peer Review of Draft Report
	Base Option Period Number 1	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 11

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 07/19/2013 To 09/30/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Connie Hart (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4340 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Angela Lower (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2036 FAX Number:

Contract Number **EP-C-12-011** Work Assignment **WA1-21**

STATEMENT OF WORK

A. Issuing Office:	US Environmental Protection Agency
B. Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
C. Title:	Peer Review of Draft Report "Estimated Summer Hot Soak Distributions for Denver's Ken Caryl IM Station Fleet"
D. Work Assignment Manager: (EPA WAM)	Constance Hart, ASD 2000 Traverwood Drive Ann Arbor, MI 48105 Tel: 734-214-4340 Fax: 734-214-4821 Email: hart.connie@epa.gov
Alternate EPA WAM:	Kent Helmer, ASD 2000 Traverwood Drive Ann Arbor, MI 48105 Tel: 734-214-4825 Fax: 734-214-4821 Email: helmer.kent@epa.gov
Project Officer (PO):	Greg Janssen, ASD-S104 2000 Traverwood Drive Ann Arbor, MI 48105 Phone: 734-214-4285 Fax: 734-214-4821 Email: janssen.greg@epa.gov
E. Period of Performance:	July 18, 2013 – September 30, 2013

BACKGROUND

Gasoline vehicles are equipped with an evaporative emission control system that limits vapor from the fuel storage system when a vehicle is parked or moving. When this system or the vehicle's gasoline delivery system malfunctions, excessive evaporative emissions can be released. Few estimates of the frequency of vehicles with evaporative emission malfunctions or

'leaks', in the fleet exist. These vehicles could have a significant impact on air quality and the hydrocarbon (HC) emission inventory.

In 2008, EPA partnered with the Colorado Department of Public Health and Environment (CDPHE) to collect light-duty vehicle (LDV) evaporative emission data at CDPHE's Lipan inspection /maintenance (I/M) station in Denver. CDPHE temporarily operated a portable vehicle emissions test SHED (PSHED) at that I/M station as a pilot test program for recruiting higher evaporative emission vehicles and testing them in large numbers. The following summer, using the Lipan pilot study as its model, CDPHE collected new light duty vehicle (LDV) and truck (LDT) evaporative emission data from the in-use vehicle fleet passing through the Ken Caryl I/M station in Denver. EPA acquired the test results from CDPHE for analysis by EPA's contractor, Eastern Research Group (ERG).

EPA's primary goal in documenting and analyzing the findings from the Ken Caryl project data is to estimate the distribution of the level of hot-soak emissions from gasoline-fueled LDVs and LDTs. The report of the analysis has been revised and updated from its original content and title, *Estimates of the Fraction of the Fleet with High Evaporative Emissions based on the Ken Caryl Station (Denver, Colorado) Field Study*, which was sent out for peer review in late 2011. Comments on the original report were extensive and led to a complete reworking of the report's premise and analysis. This new Ken Caryl data analysis, a draft report entitled, *Estimated Summer Hot Soak Distributions for Denver's Ken Caryl IM Station Fleet* (last revised May 15, 2013), is being submitted for a new round of peer review.

CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this work assignment are consistent with the work authorized in Task 11 of the contract's statement of work.

The report under review is to be treated as confidential information for the course of the review and the materials are to stay within the knowledge of the contractor, peer reviewers and EPA staff. Authorization must be sought through the EPA Project Officer (PO) or Work Assignment Manager (WAM) to discuss the material outside of the context of the peer review.

SCOPE/ OBJECTIVES

The subject draft report, *Estimated Summer Hot Soak Distributions for Denver's Ken Caryl IM Station Fleet* (May 15, 2013), for independent peer review through this work assignment, documents the 2009 Ken Caryl summer test program and presents an analysis of the resulting data. To facilitate the peer review, the contractor shall identify a number of independent subject matter experts and manage each participant's review and comment on the

new evaporative data analysis. In doing so, EPA seeks to assure its stakeholders that the analysis has been conducted in a rigorous, appropriate, and defensible way. Under EPA's peer review guidelines, all highly significant scientific and technical work products should undergo independent peer review to assure the use of the highest quality science in EPA's predictive assessments.

TASKS

The Contractor shall be familiar with the provisions of the Peer Review Handbook to ensure that EPA's peer review guidelines are met. These guidelines, EPA's Science Policy Council Peer Review Handbook, 3rd Ed., can be found at http://www.epa.gov/peerreview/ . Further, OMB's Information Quality Bulletin for Peer Review and Preamble (found in the EPA's Peer Review Handbook, Appendix B) contains provisions for the conduct of peer reviews across federal agencies and may serve as an overview of EPA's peer review process and principles.

A description of the work to be performed by the contractor in this Statement of Work follows.

Task 1. Selecting Candidate Peer Reviewers for Product Being Reviewed

The contractor shall develop a list of qualified subject matter experts from which to choose candidate peer reviewers. The contractor shall select up to three (3) qualified independent peer reviewers to comment on the new evaporative data analysis. The EPA WAM will provide written technical direction on the final number of peer reviewers to be selected. The contractor shall prepare and deliver to the EPA WAM a list that includes the names and affiliations of the selected peer reviewers, each peer reviewer's curriculum vitae or resume and a target start date for each person's peer review.

Each of the potential peer reviewers must be independent. EPA defines an "independent peer reviewer" as an expert who was not associated with the generation of the specific work product either directly by substantial contribution to its development or indirectly by significant consultation during the development of the specific product. The independent peer reviewer, thus, is expected to be objective." (For further information, see Sections 1.2.6 and 1.2.7 of EPA's Peer Review Handbook). In selecting reviewer candidates, the Contractor shall avoid those with actual or apparent conflict(s)-of-interest that would preclude an independent review. Sections 3.4.5 and 3.4.6 of the Handbook can be referenced for avoidance of conflict(s) of interest.

The contractor shall assume, for the purpose of estimating costs, that the documentation to review consists of between 60 (body of report) to 100 (approximately 40 text pages of appendices) pages of material with additional reference tables in appendices. It is anticipated

that each peer reviewer will spend approximately 25 hours in analysis of the data, assumptions and conclusions, and in writing comments.

A list of known subject matter experts from academia and industry (see Appendix A) has been included in this performance work statement as a suggested starting point from which to identify potential reviewers to participate in the peer review. The list will not limit the contractor in the identification of potential reviewers but should serve as a "jumping –off point" for potential reviewers. The contractor shall contact subject matter experts and determine whether each is able to perform the work during the period of performance. At all times, the contractor's personnel shall identify themselves as contractor employees and shall not represent themselves as EPA employees.

The contractor shall submit the names and resumes or curriculum vitaes of the pool of potential selected peer reviewer candidates to the EPA WAM for broad review. In addition, the contractor shall identify any actual, potential, or apparent conflicts of interest directly to the EPA Contracting Officer (CO). The EPA WAM may disagree with the applicable qualification requirements of the contractor's choice of a peer reviewer candidate. In such a case, the contractor may identify an alternate and forward details of that candidate to the EPA CO and WAM.

Acknowledgement of the peer reviewer candidates proposed will be provided by the EPA WAM in writing, via written technical direction. The contractor shall not commence peer review work on a particular report or analysis until such acknowledgement is received. To make the review process as credible as possible, the contractor shall **not** consult the EPA WAM in the determination of the final selection of peer reviewers from the agreed upon pool.

Task 2. Facilitation of the Peer Review

The EPA WAM will provide the contractor with the report to be reviewed and a list of suggested charge elements/directed questions, in Appendix B. At that point, the contractor shall begin the actual peer review process by distributing a charge letter and all relevant documents to the peer reviewers. In the charge to the reviewers, an overall catch-all question shall be included at section end of any prescribed questions in order to capture other comments by the reviewers that were not outlined or captured in the charge. The contractor shall assume that the peer review materials will be electronic and may be distributed by e-mail or FTP site.

Shortly after distributing the charge letter and supporting materials for a particular review product, the contractor shall arrange a teleconference between those peer reviewers it has identified in Task 1 above, the EPA WAM, EPA-identified relevant project-related staff and contractor staff to clarify any questions the peer reviewer(s) may have regarding the report/written materials. EPA may provide technical and/or background information on the particular report or analysis under review.

Future questions that a peer reviewer might have shall be directed back through the contractor for resolution through EPA's WAM. Any answer with regard to a particular peer review product and the question to which it refers shall, in turn, be shared with all the reviewers. It is not necessary, however, that the peer reviewers seek or reach consensus on their findings and recommendations since there may be limited overlap in the peer reviewers' areas of expertise and the charge questions on which a reviewer may choose to focus.

The contractor shall manage the peer review process to ensure that each peer reviewer has sufficient time to complete their review of the data analysis by the deadlines set forth in the deliverables schedule below. As each reviewer submits their comments on the analysis, the contractor shall incorporate those review comments into a draft summary report covering the peer review process and comments. After a brief period for initial review, EPA will return the draft summary report to the contractor to create a final version of the peer review report to EPA. The Contractor shall adhere to the provisions of EPA's Peer Review Handbook guidelines to ensure that all segments of the peer review will conform to EPA peer review policy.

Task 3. Documentation of the Peer Review Process

The contractor shall provide the EPA WAM with a summary report detailing the means by which reviewers were chosen, the manner in which the review process was administered, a summary of the written comments, and how the peer review was brought to a close. This report shall be included as part of the Final Technical Report detailed in Task 4. This document is in addition to copies of the reviewers' peer review comments and other supporting documentation, as detailed above.

A cover letter shall be provided with each peer reviewer's submittal. This cover letter shall clearly state the reviewer's name, the name and address of their organization, if applicable, and a statement of any real or perceived conflict(s) of interest. The contractor shall forward these documents on to the EPA WAM in electronic format along with any summary as detailed in Task 4 deliverables.

Task 4: Draft and Final Technical Report of the Peer Review

The contractor shall develop both a draft and a final version of a technical report which details the work completed including discussion of any issues encountered. The contractor shall prepare an introduction with a clear and concise overview of the comments made by the peer reviewers to the report. The draft final report shall include a written summary of all comments. The unedited reviewer comments shall also be submitted in the report along with the resumes/curriculum vitaes and a signed Conflict of Interest statement from each reviewer. EPA will review the draft report and submit comments to the contractor.

The contractor shall provide the EPA WAM with the final report of the peer review, addressing EPA input, within one week of receiving those comments on the draft document. The Final report shall be sent electronically in both Microsoft Word (*.doc or *.docx) and Adobe portable document file (*.pdf) formats.

PROJECT STATUS/REPORTING

Weekly Updates: The contractor shall be available for a weekly meeting by teleconference between EPA WAM and contractor staff, if needed, to discuss any on-going issue(s) which may arise in the course of the peer review effort.

Teleconference calls: The Contractor shall provide status updates through phone teleconferences for the EPA WAM or his designated alternate on a bi-weekly basis to summarize the progress made to date. The contractor shall indicate progress achieved in the preceding period, technical issues encountered, solutions to issues (proposed or attempted), and project activity for the next two week period. This report shall include any potential issues or circumstances that arise causing delays in the review process. The contractor shall also report if the project is beginning to exceed the hours or dollars agreed upon in the work plan. The contractor shall initiate additional contact with the EPA WAM, as needed, to resolve questions and discuss any technical issues encountered.

Monthly Status Report: The contractor shall provide a written status report with the monthly invoice sent to EPA's Contracting Officer. The monthly status reports shall track the progress made on each of the tasks/deliverables for each of the products being reviewed. The report shall summarize hours and dollars expended, as well as projections to complete work, on each of the tasks as detailed in the SOW. The report shall include information such as task and subtask names, hours spent, contact information, task start date and deadlines, deliverables, accomplishments, any technical issues encountered, work on-hold status and whether the project is on schedule.

This report shall also include any potential issues or circumstances that may arise causing any delays in the review process. The EPA PO and WAM will notify the contractor in writing regarding any changes to the report format.

DELIVERABLES SCHEDULE

The contractor shall complete deliverables in accordance with the proposed schedule below.

Milestone/Deliverable by Task	Proposed Due Date**
Work Plan Preparation	• Deliver to EPA for approval, in keeping with IAW clauses
Task 1: Reviewer Selection • Select candidate peer reviewers • Contact prospective peer reviewers to finalize participation • Receive resumes; forward peer reviewer qualifications to EPA	• Two weeks after work plan approval
Task 2: Facilitation of Peer Review • Charge letter and documents to reviewers • "Kick-off" teleconference (each report/peer review) • Peer reviewer's comments due to contractor	• Week of 07/22/2013, or earlier • Within one week of receipt of materials • 08/20/2013
Task 3: Documentation of Process • Draft report on documentation of process	• 08/31/2013 (to be combined w/ draft deliverable)
Task 4: Draft and Final Technical Reports • Draft technical report • Final technical report	• 09/13/2013 • 09/27/2013

** These dates are subject to negotiation and change as a result of EPA's regulatory schedule, availability of the final Peer Review Charge and review documents, or other factors outside of the EPA WAM's control.

Appendix A

*List of Candidate Experts/Reviewers**

The contractor may use the following list of subject matter experts as a "jumping–off" point from which to assemble the group of candidate peer reviewers. The contractor may pursue individuals identified through the contractor's own resources or query EPA's WAM for additional suggested reviewers, as needed.

* Note: the following list is not comprehensive.

Dr. Michael Tschantz
MeadWestvaco Coroporation (MWV)
Specialty Chemicals Division
5255 Virginia Avenue
North Charleston, SC 29406
Phone: 843-740-2334
cell: 540-969-7283
Email: michael.tschantz@mwv.com

Eric Fujita, Research Professor - Environmental Science
Desert Research Institute (DRI), Division of Atmospheric Sciences
University and Community College System of Nevada
2215 Raggio Parkway
Reno, NV 89512
Phone: (775) 674-7084
Email: Eric.Fujita@dri.edu

David Chen, Emission Research Section
California Air Resources
Board(CARB)
9500 Telstar Avenue
El Monte, CA 91731
Phone: 626-350-6579
Email: dchen@carb.gov

Giorgio Martini
European Commission
Joint Research Center (JRC)
Via E. Fermi 2749
1-21027 ISPRA (VA), Italy
Phone: +39-0332-789293
Email: Giorgio.martini@jrc.ec.europa.eu

Appendix B

Suggested Elements for Charge Letter to Peer Reviewers

This appendix contains background material and a list of questions specific to this analysis to be included by the contractor in a charge letter directing peer reviewers to those issues of greatest concern to the Agency. This section also contains a brief discussion of concerns which apply generally to all products for peer review.

Gasoline vehicles are equipped with evaporative emissions control systems that control vapor from the fuel storage system while a vehicle is sitting or driving. When these systems or the vehicle's gasoline delivery system malfunction, excessive evaporative emissions can be emitted. Few estimates of the frequency of vehicles with evaporative emissions malfunctions, or leaks, in the fleet exist. These vehicles can have a significant impact on the hydrocarbon (HC) emissions inventory.

The Coordinating Research Council - Real World Group through its E-77 and E-77-2 permeation evaporative emission testing programs has confirmed that leaks, both liquid and vapor, can be a significant part of any fleet HC inventory. EPA partnered with the Colorado Department of Public Health and Environment (CDPHE) in 2008 to collect data at the Lipan I/M Station in Denver, Colorado as a pilot test program for recruiting higher evaporative emission vehicles and testing them in large volumes in a portable SHED (PSHED) which was temporarily set up at the I/M station. The following summer the CDPHE collected more data at the Ken Caryl I/M station in Denver using lessons learned from the pilot study. Through the CRADA relationship with the CDPHE, EPA acquired the data for analysis by their contractor, Eastern Research Group (ERG). EPA's primary goal of the Ken Caryl project was to estimate distributions of hot-soak emission levels for gasoline-fueled light-duty vehicles and light duty trucks, using a quick and inexpensive procedure to conduct a survey of an in-use fleet. Innovative strategies were used to measure evaporative emissions data on 175 vehicles representative of the fleet entering Ken Caryl station. The report details the sampling protocol utilizing a screening system to recruit higher percentages in the higher evaporative emissions range and also a field measurement methodology with a PSHED to assess hot soak emissions from these vehicles.

This report has been revised from its original form and title, *Estimates of the Fraction of the Fleet with High Evaporative Emissions based on the Ken Caryl Station (Denver, Colorado) Field Study*, which was sent out for peer review in late 2011. The comments were so extensive as to require a complete reworking of the premises and analysis, including extensive report

revisions. With the new title and analysis, it has been deemed appropriate for another round of peer review.

In their comments, reviewers should distinguish between recommendations for clearly defined improvements that can be readily made based on data or literature reasonably available to EPA and improvements that are more exploratory or dependent on information not readily available to EPA. Your written comments should address all aspects of the report (methodologies, analysis, conclusions, and narrative) and should be sufficiently clear and detailed to allow readers to thoroughly understand their relevance to the subject report. Further, each peer reviewer should address whether appropriate conclusions and implications can be drawn from the analysis and the available data.

All materials provided to the reviewers, as well as their comments, should be treated as confidential and should neither be released nor discussed with others outside of the group of reviewers. The Agency requests that the reviewers not release the peer review materials or their comments to anyone else until EPA makes its report and supporting documentation public.

If a reviewer has questions about what is required in order to complete this review or needs additional background material, please direct the reviewer to contact the contractor's project manager for this effort. If a reviewer has a question about the EPA peer review process itself, please have the reviewer contact Ms. Ruth Schenk in EPA's Quality Office, National Vehicle and Fuel Emissions Laboratory by phone (734-214-4017) or through e-mail at schenk.ruth@epa.gov .

Some specific areas of focus include the following:

1. Does the report meet its primary goal?

2. Was the sampling methodology using the probability proportional to Index (ppEI) appropriately applied for the situation, allowing for appropriate distribution of the fleet in the end product?

3. Is the description of analytic methods and procedures clear and detailed enough to allow the reader to develop an adequate understanding of the steps taken and assumptions made to develop the Fractions in Table 4-11? Are examples selected for tables and figures well chosen and designed to assist the reader in understanding the approach and methods?

4. Are the methods and procedures employed technically appropriate and reasonable, with respect to the relevant disciplines, including physics, chemistry, engineering, mathematics and statistics? Are you able to suggest or recommend alternate approaches? In making recommendations please distinguish between cases involving reasonable disagreement in adoption of methods as opposed to cases where you conclude that current methods involve specific technical errors.

5. Is the use of hot-soak as a surrogate for elevated evaporative emissions a reasonable premise? Is it reasonable to conclude that there is potentially a link between fuel/evaporative control system leaks and high hot soak emissions?

6. Is stratification of the results by model year group a reasonable approach to distinguish fuel system and emission control technology changes?

7. Does the methodology, data, and analyses support the report's conclusion?

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 1-22

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2013 Base Option Period Number 1	Mass and Number Particle Loss

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 6 Aircraft; Task 12 Techncial Support

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 08/22/2013 To 09/30/2013

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2013 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Bob Giannelli (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4708 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

A.	EPA Contract:	EP-C-12-011
B.	Work Assignment (WA):	1-22
C.	Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
D.	Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
E.	Statement of Work:	Mass and Number Particle Losses in an Aircraft PM Sampling System
F.	Work Assignment Manager (WAM)	Bob Giannelli 734-214-4708 giannelli.bob@epa.gov
	Alternate WAM	Bryan Manning 734-214-4832 manning.bryan@epa.gov

I. BACKGROUND

Measurement of particulate matter (PM) emissions from combustion engines is motivated by their detrimental health and welfare effects. PM emissions from combustion sources are chemically complex and, due to their size, have sampling train transport properties different than gaseous emissions and hence need careful consideration. When designing a sampling system for measuring PM emissions, a concern is the inherent sample losses that can take place in the sampling train during transport from the emissions source to the measurement instrument. These losses, due mostly to well understood physical phenomena, can lead to an underestimation of the amount of the actual PM emissions from the combustion source under consideration.

Under the request of the United Nations International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP), the Society of Automotive Engineers (SAE) has established a Standards Committee, named E31, which is developing a sampling system to measure PM emitted from turbo fan aircraft engines. The sampling train has been determined to require sample line lengths and sampling train configurations which lead to what are basically unavoidable sample losses that impact both size and mass measurement. Estimates of the nonvolatile particulate matter (nvPM) mass loss in the sample train due to these physical phenomena range from >30 percent. Particle number loss estimates range from >40 percent.

These large losses lead to a reasonable concern over the accuracy of the measurement method. Hence, the E31 nvPM committee has developed a method by which the nvPM measurements can be adjusted for sample train losses based on estimated particle size distribution and penetration fractions.

This method has been reviewed internally by the E31 committee and by outside experts (EPA contract EP-C-12-011, Work Assignment 1-11). At this point, the line loss method needs to be documented for SAE and eventually for ICAO CAEP as part of a draft test procedure. Hence, the EPA has a need for an aircraft PM emission measurement expert who has knowledge of the E31 sampling system, the ICAO CAEP processes, and the line loss methodology to assist in documenting the sample train loss estimation method in a standard format acceptable to the SAE Committee. The contractor's technical expertise is critical to the success of documenting this method.

II. TASKS

The purpose of this work assignment (WA) is to have an expert on aircraft PM measurement assist in the preparation of a draft Aerospace Information Report (AIR) for E31 describing the PM loss estimation method.

Task 1: Provide technical expert

For this work assignment, EPA requires the services of an expert on physical and numerical modeling and aircraft engine emissions characterization, who is knowledgeable on measurement of nvPM emissions and analysis of PM loss in the PM measurement sample trains for both mass and particle number measurement. The contractor shall identify at least one such expert who shall prepare a draft AIR documenting the methods being developed by the SAE E-31 to account for and adjust for PM loss in the sample trains for both the mass and number aircraft engine PM measurement under the test procedure being developed by E-31. (See AIR 6241) The contractor shall consult with the EPA WAM regarding the expert's qualifications before making a selection; EPA has provided a list of several known experts in the field. This is not an all-inclusive or comprehensive list of subject matter experts, and does not limit the contractor in finding and selecting the technical expert.

The EPA WAM will acknowledge approval of the expert selected on aircraft PM measurement via written technical direction. The contractor shall not consult the EPA WAM in the final determination of the expert selected.

Task 2: Draft AIR outline

Based on information provided by the EPA WAM through written technical direction and the contractor's knowledge of the topic area, the contractor shall prepare a detailed outline of the draft AIR. This AIR should follow the format prescribed by SAE. The aforementioned AIR 6241 may serve as an example of the format, but the contractor is expected to use his/her

knowledge of the topic area and the draft materials prepared by E31 as the basis for identifying section and sub-sections topics. .

List of known technical experts:
1) Dr. Rick Miake-Lye (Aerodyne Research, Billerica, MA)
2) Dr. David Kittleson (University of Minnesota, Minneapolis, MN)
3) Dr. Ahmad Khalek (Southwest Research Institute, San Antonio, TX)
4) Dr. Max Zhang (Cornell University, Ithaca, NY)
5) David S. Liscinsky (United Technologies Research Center, East Hartford, CT)

III. DELIVERABLES

1. Kick-off Meeting. Within one week after the WA is issued, but prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WAM to ensure a common understanding of the requirements, expectations, and ultimate end products.

2. Quality Assurance Project Plan (QAPP). The contractor shall submit a draft QAPP to the EPA WAM within 2 weeks of Work Plan approval. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The Contractor shall provide a quality assurance project plan (QAPP) that describes the quality control processes used in support of the tasks. Guidance can be found at: QAPP for use of existing data: http://www.epa.gov/quality/qs-docs/found-data-qapp-rqts.pdf; Assessment Factors for relevance, applicability, utility of existing data: http://www.epa.gov/spc/pdfs/assess2.pdf; and EPA Requirements for QAPPs: http://www.epa.gov/quality/qs-docs/r5-final.pdf.

The EPA WAM will review and provide comments on the draft QAPP. A final QAPP shall be submitted within 10 business days of receipt of EPA comments.

3. Weekly Progress Reports. The contractor shall provide the EPA WAM with brief weekly status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

4. AIR Outline The contractor shall provide a draft AIR outline to EPA by September 30,2013.

Schedule of Deliverables

Steps	**Completion Date**
Kick Off Meeting	Within 1 week of receipt of Work Assignment
Draft QAPP	Within 2 weeks of receipt of work plan approval
Final QAPP	Within 10 business days of receipt of EPA comments on draft QAPP
Complete candidate search	Before September 13, 2013
Submit draft AIR outline to EPA	September 30, 2013

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by the U.S. EPA.